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PREIMPOUNDMENT STUDY OF WEST POINT LAKE, GEORGIA

Robert F. Schneider, et al

Environmental Protection Agency
Athens, Georgia

January 1972

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PREIMPOUNDMENT STUDY
OF
WEST POINT LAKE, GEORGIA

TECHNICAL STUDY
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REGION IV
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ATHENS, GEORGIA
JANUARY 1972

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PREIMPOUNDMENT STUDY
OF
WEST POINT LAKE, GEORGIA

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Details of illustrations in
this document may be better
studied on microfiche

Technical Study
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Environmental Protection Agency
Region IV
Southeast Water Laboratory
Surveillance and Analysis Division
Athens, Georgia

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TABLE OF CONTENTS

Page

INTRODUCTION 1

SUMMARY 3

CONCLUSIONS 8

RECOMMENDATIONS 9

DESCRIPTION OF THE STUDY AREA 10

CHATTAHOOCHEE WATERSHED 10

WEST POINT DAM AND LAKE 10

THE STUDY AREA 12

STUDY METHODS 28

SAMPLING STATIONS 28

SAMPLING SCHEDULE 28

PHYSICAL AND CHEMICAL ANALYSES 29

BIOLOGICAL ANALYSES 29

BACTERIOLOGICAL ANALYSES 32

STUDY FINDINGS

PREVIOUS STUDIES 36

1970-1971 STUDIES 40

RAINFALL AND RIVERFLOW 40

CORRELATIONS OF FLOW WITH WATER QUALITY PARAMETERS 40

TEMPERATURE 44

COLOR AND TURBIDITY 44

pH, CONDUCTIVITY AND SOLIDS 46

DISSOLVED OXYGEN AND BIOCHEMICAL OXYGEN DEMAND 47

Table of Contents cont'd

Page

ALKALINITY 49

CHLORIDE 49

NITROGEN AND PHOSPHORUS 49

TOTAL ORGANIC CARBON 50

IRON AND MANGANESE 51

DIURNAL STUDIES. 53

PHYTOPLANKTON. 53

PERIPHYTON 53

MACROINVERTEBRATES 62

COLIFORM BACTERIA. 65

ISOLATION OF SALMONELLA. 73

ENVIRONMENTAL CHANGES FOLLOWING IMPOUNDMENT. 83

GENERAL. 83

PHYSICAL CHANGES 83

CHEMICAL CHANGES 84

BIOLOGICAL CHANGES 85

REFERENCES 87

APPENDICES

A Correspondence Requesting the Study

B Location of Sampling Stations

C USPHS Water Quality Data for the Chattahoochee River Basin 1964, 1965, and 1966

D A Brief Biological Survey of the Chattahoochee River and Selected Tributary Streams by William M. Beck, Jr., June 1965.

Table of Contents cont'd

APPENDICES cont'd

E Statistical Summary of Water Quality Data, Chattahoochee River Basin, August and September 1970

F Statistical Summary of Water Quality Data, Chattahoochee River Basin, February 1971

G Statistical Summary of Water Quality Data for a Diurnal Study at Stations 5, 6, 10 and 12, Chattahoochee River Basin, September 1970

H Phytoplankton Data for West Point Preimpoundment Surveys, September 1970 and February 1971

I Seasonal Distribution of Invertebrates Collected from Artificial Substrates in the Chattahoochee River and Major Tributaries Within the West Point Lake (Preimpoundment Study)

J Georgia Water Quality Standards and Chattachoochee River Classification

PARTICIPATING STAFF

FIGURES

Page

Figure 1. The West Point Gravity-type Dam Being Constructed in the Chattahoochee River, Georgia 11

Figure 2. The Chattahoochee River Downstream from the West Point Dam 11

Figure 3. Sampling Stations - Location Map. . . . . Rear of Report

Figure 4. The Shallow Chattahoochee River Near Georgia Highway 109 Bridge Crossing 13

Figure 5. The Deering Milliken Industrial Water Intake. . . 14

Figure 6. The "Old" City of LaGrange Municipal Water Intake on the Shoreline of the Chattahoochee River,Ga. . 14

Figure 7. The Newly Constructed City of LaGrange Municipal Water Intake Designed for the Expected Reservoir Depths. 14

Figure 8. City of LaGrange, Hogansville Road Sewage Treatment Plant. 16

Figure 9. City of LaGrange, Yellowjacket Creek Sewage Treatment Plant. 16

Figure 10. U. S. Rubber Company Textile Plant at Hogansville, Georgia 17

Figure 11. The Franklin Aluminum Company on the Chattahoochee River Near Franklin, Georgia. 18

Figure 12. The City of Franklin, Georgia, Sewage Treatment Plant 18

Figure 13. The Southeast Water Laboratoary Mobile Unit at LaGrange, Georgia 30

Figure 14. Artificial Substrate Used to Collect Periphyton . 33

Figure 15. Artificial Substrate Used to Collect Macroinvertebrates. 33

Figure 16. Dissolved Oxygen Profiles Upstream From West Point Site (From Georgia Water Quality Board) . . 37

List of Figures cont'd

Page

Figure 17. Fecal Coliform - Geometric Means - Upstream From West Point Site 38

Figure 18. Stream flow During the Survey Periods 41

Figure 18A. Coliform Counts Averages (Left and Right Banks) of Station 12 at Franklin. 42

Figure 19. Average Water Temperature During Survey Periods . . 45

Figure 20. Average Hourly Quality Varations at Stations 5, 6, 10 and 12, September 17, 1970. 54

Figure 21. Comparison of Average Total Phytoplankton Populations (Summer and Winter Survey Period) . . . 55

Figure 22. Relative Density of Certain Invertebrates at Each Station During the Summer Survey 63

Figure 22A. Relative Density of Certain Investebrates at Each Station During the Winter Survey. 64

Figure 23. Geometric Mean Total Coliform Densities at the Chattahoochee River Stations. 67

Figure 24. Geometric Mean Fecal Coliform Densities at the Chattahoochee River Stations. 68

Figure 25. Geometric Mean Total and Fecal Coliform Densities at the Tributary Stations 69

Figure 26. Coliform Dieoff Pattern Within Chattahoochee River Study Area Expressed in Percent of Initial Density Entering the Study Area 71

Figure 27. Comparison of the Geometric Mean Total Coliform Densities at the River Stations in Wet and Dry Periods 74

Figure 28. Comparison of the Geometric Mean Fecal Coliform Densities at the River Stations in Wet and Dry Periods 75

Figure 29. Comparison of the Geometric Mean Total Coliform Densities at the Tributary Stations in Wet Period and Dry Period 76

Figure 30. Comparison of the Geometric Mean Fecal Coliform Densities at Tributary Stations in Wet Period and Dry Period. 77

LIST OF TABLES

Page

Table I. Sources of Municipal Pollution to the Chattahoochee River 21

Table II. Sources of Industrial Pollution 27

Table III. Physical and Chemical Analyses 31

Table IV. Identification Scheme for *Salmonella* Suspects . . 35

Table V. Rainfall Data 43

Table VI. Comparison of Average Biomass and Relative Abundance of Periphyton Summer 1970 and Winter 1971 56

Table VII. Periphyton Population at Sampling Stations in the Chattahoochee River and Tributaries (August 1970) 58

Table VIII. Periphyton Population at Sampling Stations in the Chattahoochee River and Tributaries (February 1971) 60

Table IX. Bacteriological Data Summary 66

Table X. Coliform Densities-Rainfall Periods Versus Dry Periods 78

Table XI. Fecal Coliform Densities and *Salmonella* Serotypes Recovered at Selected Stations During Summer Study 80

Table XII. Fecal Coliform Densities and *Salmonella* Serotypes Recovered at Selected Stations During Winter Study 81

PREIMPOUNDMENT STUDY
OF
WEST POINT LAKE, GEORGIA

INTRODUCTION

The Southeast Region, Environmental Protection Agency, Office of Water Programs was requested by letter of 6 February 1970 from the U. S. Army Engineer District, Savannah, Georgia, to conduct a preimpoundment water quality study for the West Point Project. Authorization for such a study may be found in Section 5c of the Federal Water Pollution Control Act (PL 84-660) as amended by PL 87-80, PL 89-234, PL 89-753, and PL 91-224. Correspondence concerning the study request is contained in Appendix A.

The Environmental Protection Agency extends its gratitude to the following agencies and individuals for their cooperation with Southeast Water Laboratory (SEWL) personnel during the survey:

- The U. S. Corps of Engineers and Mr. O. B. Stewart, Jr. Resident Engineer, for providing maps and pertinent impoundment information.
- U. S. Geological Survey for providing streamflow data.
- Messrs. Hughes, Sherrer, White, Norsworth and Levens of the City of LaGrange, Georgia, for arranging mobile laboratory space.
- Mr. Roy Relihan and the National Climatic Center Office in LaGrange, Georgia, for providing temperature and rainfall data.

Personnel from the Southeast Water Laboratory conducted field studies during August and September 1970 and February 1971 to determine annual seasonal varations in important physical, chemical and biological water quality parameters within and immediately downstream from the future reservoir. Data from these seasonal studies in conjunction with earlier study data (1)(2)(3) provided sufficient information to describe preimpoundment water quality conditions.

SUMMARY

The West Point Lake is to be located in west-central Georgia in a 3,380 square-mile watershed. Seventy percent of the watershed is farmland and 30 percent is industrial and residential (largely the Metropolitan Atlanta area). The reservoir will cover 25,900 acres at maximum power pool of 635 feet above mean sea level. It is designed to provide hydroelectric power, flood control, navigation, water supply and recreation. Preimpoundment water quality was determined from U. S. Public Health Service studies in 1964, 1965 and 1966; from Georgia Water Quality Control Board studies in 1968 and 1969; and from EPA, SEWL studies in 1970 and 1971

1. The studies showed the following physical characteristics:
    a. Maximum water temperatures ranged from 25°-29°C during the hot, dry summer periods.
    b. Water color values did not exceed 65 cobalt color units and generally averaged from 15 to 25.
    c. During heavy runoff periods, the river, and to a lesser degree, its tributaries became reddish in color due to suspended clay sediment. Turbidity values reached highs of 250 Jackson candle units, with average values of 23 to 55 in the summer and 46 to 96 in the winter.
    d. Mineral content of the waters was low. Specific conductance ranged from 33 to 84 μmhos/cm. Alkalinities seldom exceeded 20 mg/l as $CaCO_3$ while total dissolved solids rarely exceeded 150 mg/l.

on physical, chemical, and biological properties

2. Chemical Characteristics (EPA 1970-71 summer and winter studies combined):

   a. The pH of the waters in the Chattahoochee and tributary streams varied 0.7 unit or less from pH 7.

   b. At the station closest to Atlanta (Station 12 at Franklin -- the station farthest upstream) the dissolved oxygen content was less than 5 mg/l several times during the low flow periods of August and September 1970 with a low of 3.4 mg/l. Downstream and tributary stations usually had values above 6 mg/l even during the summer low-flow conditions.

   c. At the same station (No. 12) the BOD_5 value reached a maximum of 2.8 mg/l during stable summertime flows. Although this value is low, it is nearly twice the next highest value (1.5 mg/l) recorded at any other station studied in the summer. Following winter rainstorms, BOD_5 values reached highs of 5.7 mg/l in Wehadkee Creek (Station 13) and 5.2 mg/l in the Chattahoochee at Station 10 (15 miles downstream from Franklin) reflecting the unstable wintertime streamflows and associated flushing action.

   d. Total organic carbon (TOC) reached a maximum of 14.0 mg/l during the 1970 and 1971 surveys at Station 10 following a very heavy winter rain. Generally TOC averaged 3.5 to 6.5 mg/l.

   e. Organic nitrogen (total kjeldahl nitrogen less ammonia nitrogen) seldom exceeded 0.7 mg/l except during high, winter flows when it reached 1.4 mg/l at several stations. Inorganic nitrogen (sum of ammonia, nitrite and nitrate forms) ranged from 0.5 to 1.0 mg/l.

- f. Total phosphorus consistently ranged from 0.2 to 0.4 mg/l as P, one-half or less of which was the soluble form.
- g. Total iron content in the Chattahoochee water ranged from 0.2 to 73.0 mg/l. (Both extremes were from the Chattahoochee; the high was about 5 times the mean — Sta. 10B in February 1970.) The dissolved iron concentration often exceeded 0.3 mg/l, reaching a maximum value in August 1970 of 0.8 mg/l at Station 2, just downstream from the proposed dam site.
- h. Total manganese station averages throughout the study area ranged from 0.13 to 0.43 mg/l, and the average dissolved manganese concentration ranged from 0.04 to 0.17 mg/l. The highest single value for dissolved manganese (0.44 mg/l) was recorded from Wehadkee Creek (Station 4). Six other stations had dissolved manganese maximums ranging from 0.20 mg/l to 0.25 mg/l.

3. Bacteriological Characteristics (for both summer and winter EPA studies):
    - a. The arithmetic mean fecal coliform densities upstream from Station 3 (just upstream from the proposed dam site) were in violation of the present Georgia recommended recreation standard of 1000 fecal coliforms per 100 ml.*
    - b. Station 12 (the farthest upstream station) yielded the highest geometric mean total coliform density (66,000/100 ml) and the highest geometric mean fecal coliform density (5,100/100 ml) recorded during the study. These high

---

* Number currently under review. See discussion in text on page 67.

densities, reflected upstream sanitary waste discharges principally from the greater Atlanta area.

c. A 70 to 80 percent decrease in indicator densities occurred in the river reach from Franklin, Georgia, to West Pont, Georgia.

d. Fecal pollution was evident in Yellowjacket Creek as a result of treated discharges from the City of LaGrange's Yellowjacket Waste Treatment Plant and the Hogansville, Georgia, Sewage Treatment Plant. Upstream from the Yellowjacket plant (Station 9) the geometric mean fecal coliform density was 600/100 ml. Downstream (Station 8) densities increased to a geometric mean of 1800/100 ml.

e. Minor fecal contamination appeared to be contributed by wildlife and livestock, primarily in the tributaries studies. Geometric mean fecal coliform densities were generally less than 600/100 ml.

f. Rainstorms during both the 1970-71 seasonal studies caused an expected rise in bacterial indicator densities. Additional fecal contamination and nonfecal soil related coliform strains were introduced into the streams by land runoff.

g. Serotypes of Salmonella were isolated at seven stations during the summer study and at all 13 stations during the winter study. The summer isolation came from five of the seven main-stem Chattahoochee stations and from the tributary stations downstream from wastewater treatment plants.

4. Biological Characteristics (1970-71 EPA studies):

   a. In Yellowjacket and Wehadkee Creeks, over 90 percent (by number) of the attached periphyton were filamentous blue-green algae. Similar algal growth was found in the Chattachoochee River during the summer study. At Station 6 (about the mid-point of the proposed reservoir) over 70 percent of the algae (by number) were attached filamentous blue-greens.

   b. Phytoplankton densities did not exceed 600 algal cells per milliliter during the 1970 and 1971 surveys.

   c. During the August-September 1970 low water study, the Chattahoochee River benthos (bottom) from Franklin, Georgia, to Station 10 (15 miles downstream) was biologically degraded. A profuse benthic population of leeches, worms and snails reflected an organically polluted environment. Farther downstream and in the major tributaries, a healthy benthic faunal community occurred.

CONCLUSIONS

1. The potential for accelerated eutrophication and its associated nuisance problems are increased greatly by both past and current municipal and industrial development in the West Point Lake watershed.
2. Thermal stratification is expected to occur following impoundment. Associated hypolimnetic problems of low dissolved oxygen, sulfide odors, and high levels of dissolved iron and manganese (which interfere with water supply uses) may also occur unless corrective measures are taken.
3. Numerous isolations of *Salmonella* serotypes from the study area indicate that several areas are hazardous for primary contact recreation at the present time. Fecal coliform densities at many stations violate recreational water quality criteria.
4. After closure of the dam, the increased residence time in the lake will tend to dampen water quality variations now present in the free-flowing streams and partially reduce bacterial densities and water turbidity from preimpoundment levels to levels acceptable for a variety of water uses.
5. Water quality should improve following completion of secondary biological treatment and chlorination at Atlanta's R.M. Clayton wastewater treatment plant (scheduled for May 1973). Most other wastewater treatment plants in the Atlanta area that discharge to the Chattahoochee River will also provide secondary treatment and disinfection by that time. However, combined sewer discharges from Atlanta during rains will probably cause problems for years to come.

RECOMMENDATIONS

1. Postimpoundment studies should be conducted as soon as stable conditions are reached within the lake and downstream from the dam in order to determine water quality changes. If adverse conditions exist, implementation of remedial measures should begin as soon as possible.
2. Water suppliers should be kept advised by the Corps of Engineers in cooperation with state agencies of the postimpoundment concentrations of dissolved iron, manganese and sulfides. The water suppliers may need selective water level withdrawal techniques, water treatment modification, or other water quality control techniques.
3. To preclude water quality problems associated with thermal stratification of the reservoir, preventative measures must be taken -- primarily to avoid anaerobic conditions in the hypolimnetic zone. Preventative measures include, but are not limited to, artificial destratification or direct oxygenation of the hypolimnion without destratification (The former has proven effective for large impoundments). The reservoir area near the dam would require principal attention to avoid release of poor quality water, but other areas may need treatment to protect water supplies withdrawn from the reservoir.
4. Primary contact recreation should be restricted in upper reaches of the proposed reservoir until bacterial quality is determined at the time and immediately after filling (in consultation with the Georgia Water Quality Control Board). Restrictive zoning may be necessary in the future.

DESCRIPTION OF THE STUDY AREA

CHATTAHOOCHEE WATERSHED

The Chattahoochee River rises in the Blue Ridge Mountains in northeast Georgia form the confluence of several headstreams. It flows 235 miles southwestward across northern Georgia to West Point, then turns southward forming the Georgia-Alabama and Georgia-Florida boundaries until it joins the Flint River at Chattahoochee, Florida. The combined waters of these two streams form the Apalachicola River in Florida.

WEST POINT DAM AND LAKE

West Point, Georgia, is the northern-most of five textile towns in the central Chattahoochee Valley; the others are the Alabama towns of Lanett, Shawmut, Langdale and Fairfax. Less than three miles north of West Point (at River Mile 308.7*), the Corps of Engineers is constructing the 5,978-foot-long, 95-foot-high, gravity-type West Point Dam across the Chattahoochee River (Figures 1 and 2). When completed, the dam will create the fourth largest impoundment on the Chattahoochee River and will impound approximately 35 miles of the River, extending from West Point upstream to Franklin, Georgia. The reservoir will serve the multiple purpose of power, flood control, navigation, water supply and recreation (4). The 28,400-acre lake (normal pool) will have more than 500 miles of waterfront shoreline. Principal streams flowing into the

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* River mileage given in this paper is an upstream measurement beginning at the mouth of the Apalachicola River in Florida.

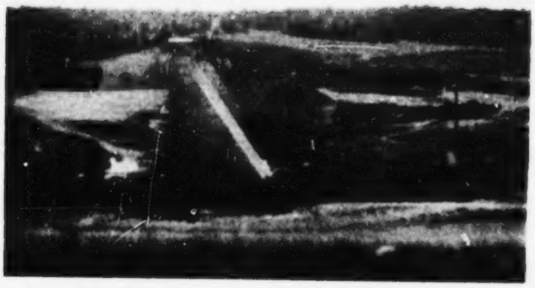

Figure 1. The West Point Gravity-type Dam being constructed in the Chattahoochee River, Georgia (mile 308.7-September 1970)

Figure 2. The Chattahoochee River downstream from the West Point Dam (mile 308.6 - February 1971)

reservoir will include the New River and Yellowjacket and Wehadkee Creeks.

THE STUDY AREA

The preimpoundment study area of the Chattahoochee was from the City of Franklin to West Point, Georgia (see Figure 3: Location Map at rear of report). The river is very shallow in the study area (Figure 4). The riverbed is composed of various combination of silt, clay, sand and rock, and has an average gradient of 2.1 feet/mile in this reach. In many place rock riffles cross it completely. The banks of the main river and its tributaries have a dense cover of foliage making river access difficult.

WATER SUPPLY

From Franklin, Georgia, downstream to the dam site, the river has been classified for recreation (5). Within this area, there are two water intakes. Deering Milliken of LaGrange has an industrial intake in the main channel of the Chattahoochee River (Figure 5) and the City of LaGrange a 2 mgd million gallon per day municipal water intake (Figures 6 and 7).

SOURCES OF WASTES

Within the reservoir drainage basin the chief industries are agriculture and textile manufacturing. An inventory of industrial and domestic waste sources showed that three streams will carry major amounts of wastewater into the proposed reservoir: Yellowjacket Creek, New River and the Chattahoochee River.

Yellowjacket Creek will enter the impoundment 12.5 miles upstream from the dam. This creek receives partially treated

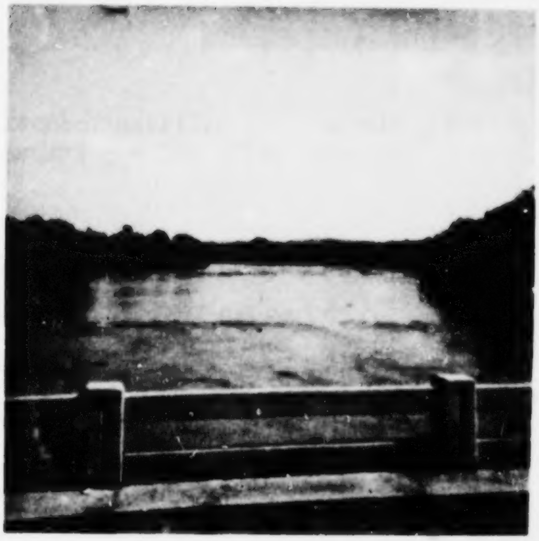

Figure 4. The shallow Chattahoochee River near Georgia Highway 109 Bridge Crossing (mile 316.2 - September 1970).

Figure 5. The Deering Milliken Industrial Water Intake. (mile 321.9 - February 1971)

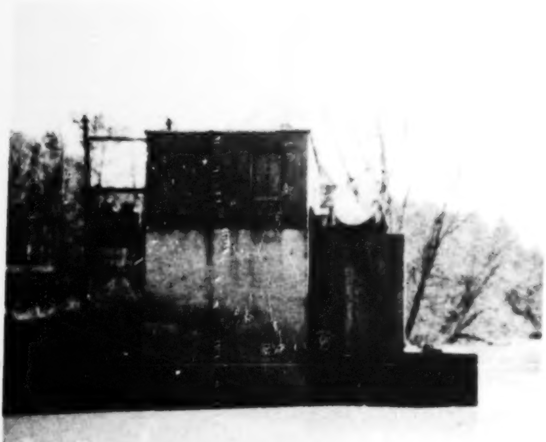

Figure 6. The "old" City of LaGrange Municipal Water Intake on the Shoreline of the Chattahoochee River, Georgia (mile 323.0 - February 1971).

Figure 7. The newly constructed City of LaGrange Municipal Water Intake Designed for the Expected Reservoir Depths (mile 323.0 - February 1971).

municipal wastes from Grantville, Hogansville, and LaGrange (Figures 8 and 9), Georgia, with an estimated biochemical oxygen demand (BOD) waste load of 650 population equivalents (PE) after treatment (Table I). The municipal waste at Hogansville includes small quantities of industrial wastes including that from the U. S. Rubber Company textile plant (Figure 10).

The New River will enter the impoundment 24.7 miles upstream from the dam. It receives treated domestic wastewater from Grantville and Newnan with an estimated BOD load of 1,450 PE after treatment (Table I). The William L. Bennell Company, an aluminum anodizing industry, discharges inadequately treated wastewater into a tributary of the New River.

The Chattahoochee River is expected to be impounded by the West Point Dam upstream to mile 343.0 in the vicinity of Franklin, Georgia. The Franklin Aluminum Company, located in this area, discharges inadequately treated process wastes to the Chattahoochee River (Figure 11). The City of Franklin will discharge its treated waste directly into the impoundment (mile 342.4) about 34 miles upstream from the dam (Figure 12). Principal waste sources upstream from Franklin are concentrated in the Atlanta metropolitan area.

Between Buford Dam and the City of Atlanta's Clayton Treatment Plant, some 50 wastewater treatment facilities with a combined design capacity of about 8.43 MGD discharge their effluents either directly to the river or to one of its tributaries (2). Most of these facilities

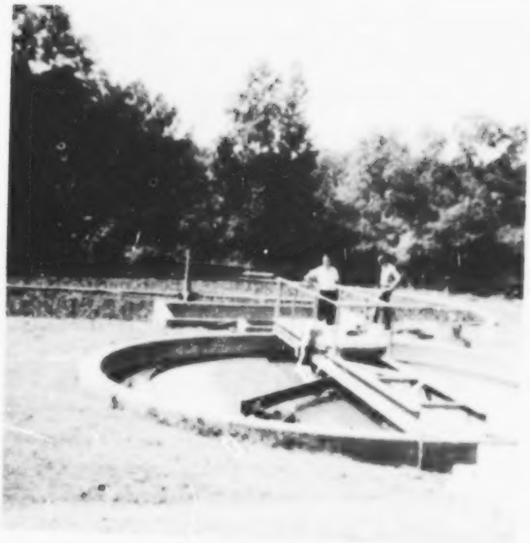

Figure 8. Hogansville Road Sewage Treatment Plant, City of LaGrange.

Figure 9. City of LaGrange, Yellowjacket Creek Sewage Treatment Plant.

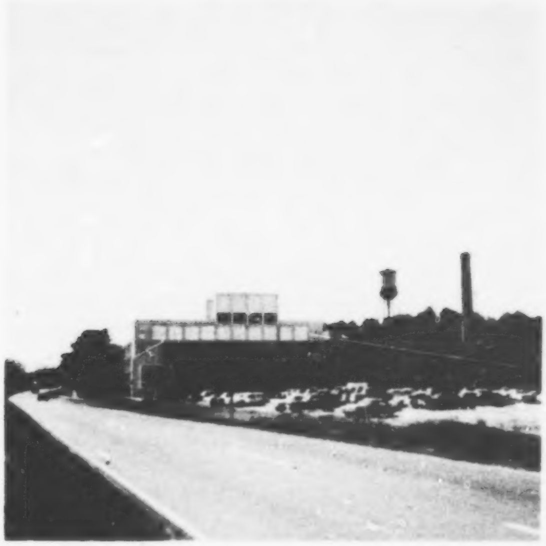

Figure 10. U. S. Rubber Company Textile Plant at Hogansville, Georgia

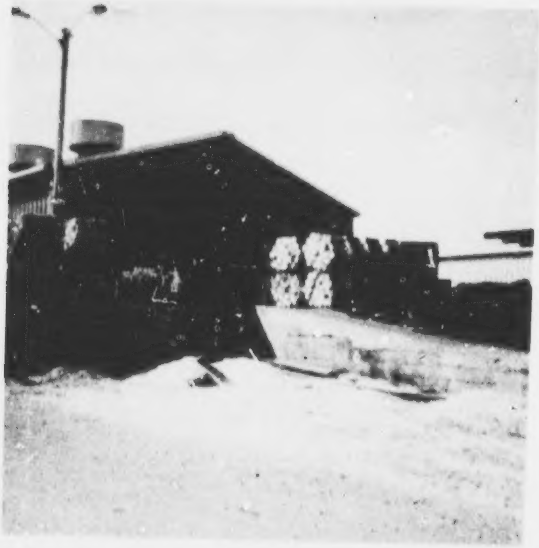

Figure 11. The Franklin Aluminum Company on the Chattahoochee River near Franklin, Georgia (mile 342.9 - September 1970).

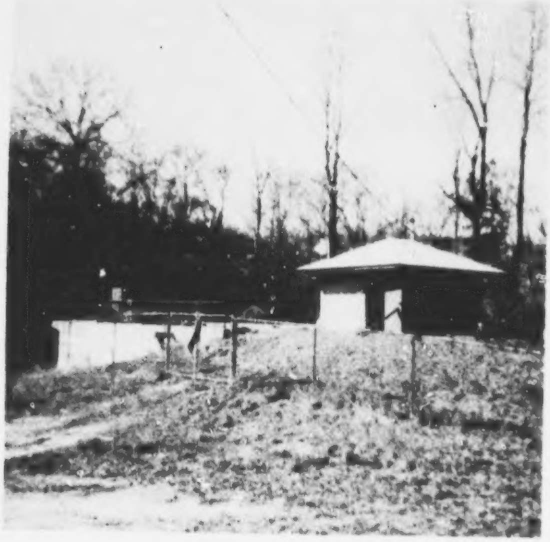

Figure 12. The City of Franklin Sewage Treatment Plant. (mile 342.4 - February 1971).

are small package plants or stabilization ponds serving subdivisions or apartment complexes. About 90 percent of the wastewater is domestic, with the remainder being tannery, metal plating and poultry processing wastes. The two largest domestic facilities are Marietta's 1.5 mgd trickling filter plant on Sope Creek and the 2.0 mgd trickling filter plant on Rottenwood Creek.

An additional 0.2 mgd of treated domestic wastes and an undetermined amount of industrial wastes, mostly metals and oils, are discharged to Peachtree Creek, which joins the Chattahoochee River just downstream from Atlanta's water intake structure and just upstream from the R. M. Clayton Treatment Plant.

All of these wastewater sources contribute to the conditions of the Chattahoochee River at mile 408.2. Between river mile 408.2 and 389.4, the City of Atlanta presently operates three wastewater treatment facilities which provide primary treatment without disinfection of effluents. These primary plants discharge 280,000 PE of biochemical oxygen demanding materials (see Table I).

By May 1973 these wastes should be reduced to about 60,000 PE (plus some allowance for municipal growth) through secondary activated sludge treatment and disinfection. The R. M. Clayton Plant is under construction for upgrading to secondary treatment; the Sandy Creek Plant will be abandoned and its influent will be diverted to the Clayton Plant; and the Utoy Creek Plant will be upgraded, with construction beginning November 1971.

Fulton County's treatment plants discharging to the Chattahoochee will also be consolidated and upgraded to secondary treatment with disinfection. The Big Creek Plant will be expanded from 0.7 to 10 mgd capacity. Construction for this plant will begin November 1971 for completion by January 1973. The presently overloaded March Creek and Fulco plants will be abandoned. The Camp Creek Plant in south Fulton County will be upgraded from primary to secondary treatment.

Cobb County's plants on the Chattahoochee will also be consolidated and upgraded to secondary treatment with disinfection. By May 1973 Cobb County will operate only the new Chattahoochee Plant (presently overdue on starting construction) and the South Cobb Plant.

By the time Atlanta's Clayton Plant is finished in May 1973, the most significant pollution to the Chattahoochee from the greater Atlanta area will be urban surface runoff and combined sewer overflow (by-pass of treatment plants) during rains.

The importance of pastureland draingage as a waste source was not overlooked; however, it was omitted from the sanitary inventory presented in Table I and II because of the difficulty in pinpointing or defining the impact of this source.

TABLE I

SOURCES OF MUNICIPAL POLLUTION TO THE CHATTAHOOCHEE RIVER *

County, City, or Subdivision	Sewered Population Equivalent	Design Flow (mgd)	Treatment	PE Dis-charged	Receiving Stream	Miles Upstream From West Point, Georgia
Cumming	6,000	0.6	Oxidation Lagoon	1,800	Big Creek	120
Buford	5,000	0.5	Primary	3,500	Suwanee Creek	132
Marietta (Old East)	10,000	1.0	TF + Cl_2	1,500	Sope Creek	114.5
Marietta (South)	10,000	1.0	TF + Cl_2	1,500	Olley Creek	98
Marietta (Southeast)	20,000	2.0	TF + C12	3,000	Rottenwood Creek	111
Marietta (West)	10,000	1.0	TF + Cl_2	1,500	Sope Creek	108
Marietta (New East)	15,000	1.5	TF + Cl_2	2,250	Sope Creek	108
Marietta (Sope Creek Farms)	660	0.066	Activated Sludge + Cl_2	109	Sope Creek	108
Air Force Plant 6 - Lockheed Ba. Corp. (Industrial)	30,500	3.5	Chem. Treatment		Nickajack Creek	106
Dobbins AFB (Domestic)	25,000	2.5	TF + Cl_2	3,750	Nickajack Creek	106
Church Road	20,000	2.0	TF + Cl_2	3,000	Nickajack Creek	106
Smyrna	4,000	0.4	TF + Cl_2	600	Bohannon Creek	106
Fulton County (Big Creek)	7,000	0.7	Activated Sludge + Cl_2	700	Willeo Creek	
Camp Creek Plant	25,000	2.5	Primary + Cl_2	17,500	Camp Creek	95.1
Cater Creek			Oxidation Lagoon		Cater Creek	
Fulco Plant	10,000	1.0	Primary	7,000	Chattahoochee	102

*Data based on Inventory of Water Pollution Control Facilities, Vol. I, Cities and Counties, Georgia Water Quality Control Board, March 1971.

Notes: TF - Trickling filter
Cl_2 - Chlorination

TABLE I (cont'd)

SOURCES OF MUNICIPAL POLLUTION TO THE CHATTAHOOCHEE RIVER*

County, City, or Subdivision	Sewered Population Equivalent	Design Flow (mgd)	Treatment	PE Dis-charged	Receiving Stream	Miles Upstream From West Point, Georgia
Marsh Creek	7,500	0.75	TF + Cl_2	1,225	Chattahoochee	116
Stubbs Road	80	0.008	Activated Sludge + Cl_2	8	Deep Creek	
Austell	5,000	0.5	Primary	3,500	Sweetwater Creek	98.2
Allyson Park S/D	3,200	0.32	Oxidation Lagoon		Noses Creek	98.2
Atlanta Country Club	60	0.06	Activated Sludge + Cl_2	6	Chattahoochee	
Blue Springs Mobile Home Park	276	0.0207	Activated Sludge + Cl_2	28	Acworth Lake	
Bordeaux Apartments	1,500	0.150	Activated Sludge + Cl_2	150	Rottenwood Creek	111
Calloway Acres	470	0.047	Oxidation Lagoon		Olley Creek	101
Church Road Plant	20,000	2.00	TF + Cl_2	3,000	Nickajack Creek	106
Civitania Woods S/D	220	0.022	Oxidation Lagoon		Nickajack Creek	106
Clarkdale	500	0.050	Primary	350	Sweetwater Creek	98.2
Cobb Gen. Hospital	1,500	0.150	Activated Sludge + Cl_2	150	Olley Creek	101
Cochise S/D	500	0.050	Activated Sludge + Cl_2	50	Chattahoochee	
Cumberland Apartments	2,977	0.231	Activated Sludge + Cl_2	297	Chattahoochee	

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* Data based on Inventory of Water Pollution Control Facilities, Vol. I, Cities and Counties, Georgia Water Quality Control Board, March 1971.

TABLE I (cont'd)

SOURCES OF MUNICIPAL POLLUTION TO THE CHATTAHOOCHEE RIVER *

County, City, or Subdivision	Sewered Population Equivalent	Design Flow (mgd)	Treatment	PE Discharged	Receiving Stream	Miles Upstream From West Point, Georgia
Farmington S/D	260	0.026	Activated Sludge + Cl_2	26	Chattahoochee	
Forest Acres S/D			Oxidation Lagoon		Chattahoochee	
Frontier Trails S/D	260	0.026	Oxidation Lagoon		Nickajack Creek	106
Golden Acres	150	0.015	Activated Sludge + Cl_2	15	Sweetwater	98.2
Haven Hill (Mobile Home Park)	560	0.042	Activated Sludge + Cl_2	56	Acworth Lake	
Heritage Hills	640	0.064	Oxidation Lagoon		Buttermilk Creek	
Interstate North Dev. Co.	1,850	0.140	Activated Sludge	185	Rottenwood Creek	111
Kenwood S/D	700	0.07	Activated Sludge + Cl_2		Nickajack Creek	106
Maple Valley S/D	400	0.040	Oxidation Lagoon		Nickajack Creek	106
Regency Apartments	580	0.058	Activated Sludge + Cl_2	58	Rottenwood Creek	111
Riverbend Apartments	3,000	0.300	Activated Sludge + Cl_2	300	Chattahoochee	
Rustic Village S/D	240	0.024	Oxidation Lagoon		Olley Creek	101
Seven Springs S/D	500	0.050	Activated Sludge	50	Sope Creek	114.5

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* Data based on Inventory of Water Pollution Control Facilities, Vol. I, Cities and Counties, Georgia Water Quality Control Board, March 1971.

TABLE I (cont'd)

SOURCES OF MUNICIPAL POLLUTION TO THE CHATTAHOOCHEE RIVER*

County, City, or Subdivision	Sewered Population Equivalent	Design Flow (mgd)	Treatment	PE Discharged	Receiving Stream	Miles Upstream From West Point, Georgia
Shadow Bluff Apts.			Activated Sludge + Cl_2		Chattahoochee	
South Cobb Plant	20,000	2.00	Activated Sludge + Cl_2	2,000	Chattahoochee	95
Terrell Mill S/D	720	0.072	Aerate Lagoon		Sope Creek	114.5
Tree Top Apartments	1,400	0.140	Activated Sludge + Cl_2	140	Chattahoochee	
Wallace Mobile Home Park	222	0.017	Activated Sludge + Cl_2	22	Chattahoochee	
Waverlv Woods	200	0.020	Activated Sludge + Cl_2	20	Sewell Mill Creek	
Westgate S/D and Country Farm			Oxidation Lagoon		Olley Creek	101
Windy Hill Village	3,500	0.350	Activated Sludge + Cl_2	350	Rottenwood Creek	111
Woodland Brook Farms S/D	160	0.016	Activated Sludge	16	Chattahoochee	
Vinings Height S/D					Chattahoochee	
Douglasville	900	0.090	Primary	630	Unnamed Stream	93
	2,400	0.240	Primary	1,680	Unnamed Stream	93
Atlanta (Clayton)	420,000	42.000	Aeration + Cl_2	210,000	Chattahoochee	107

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* Data based on Inventory of Water Pollution Control Facilities, Vol. I, Cities and Counties, Georgia Water Quality Control Board, March 1971.

SOURCES OF MUNICIPAL POLLUTION TO THE CHATTAHOOCHEE RIVER *

County, City, or Subdivision	Sewered Population Equivalent	Design Flow (mgd)	Treatment	PE Discharged	Receiving Stream	Miles Upstream From West Point, Georgia
Atlanta (Sandy Creek)	10,000	1.00	Primary	7,000	Chattahoochee	105
Atlanta (Utoy Creek)	90,000	9.00	Primary	63,000	Utoy Creek	101
Fairburn (Line Creek)	2,200	0.220	Activated Sludge + Cl_2	220	Line Creek	95
Fairburn (Spence Branch)	400	0.040	TF	60	Spence Branch	95
Union City	2,450	0.245	Activated Sludge + Cl_2	245	Deep Creek	95
Palmetto	6,000	0.600	Activated Sludge + Cl_2	600	Town Branch	86
Arnco Mills	7,000	0.700	Primary	4,900	Wahoo Creek	62
Newnan	7,500	0.750	Activated Sludge + Cl_2	750	Mineral Springs	51 - 70
Newnan	3,500	0.350	Secondary	525	Cotton Mill Branch	
Newnan	4,000	0.400	Secondary + Cl_2	600	Snake Creek	
Newnan	400	0.040	Activated Sludge + Cl_2	40	Sandy Creek	
Sargent	600	0.060	Primary	420	Wahoo Creek	62
Grantville			Septic Tank		Yellowjacket Creek	35 - 44
Grantville			Septic Tank		Walnut Creek	

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* Data based on Inventory of Water Pollution Control Facilities, Vol. I, Cities and Counties, Georgia Water Quality Control Board, March 1971.

TABLE I (cont'd)

SOURCES OF MUNICIPAL POLLUTION TO THE CHATTAHOOCHEE RIVER *

County, City, or Subdivision	Sewered Population Equivalent	Design Flow (mgd)	Treatment	PE Discharged	Receiving Stream	Miles Upstream From West Point, Georgia
Franklin	850	0.085	Activated Sludge	85	Chattahoochee	34
Hogansville	5,000	0.50	Activated Sludge + Cl_2	500	Yellowjacket Creek	32
LaGrange (Shoal Ck.)	2,500	0.250	TF + Cl_2	375	Shoal Creek	19 - 26
LaGrange Blue John (Sewage)	2,500	3.500	TF + Cl_2	375	Blue John Creek	(Below Dam)
LaGrange Yellowjacket	10,000	1.00	TF + Cl_2	150	Yellowjacket Creek	32
LaGrange Blue John (Industrial)	51,000	2.5	Aeration	1,530 (70%)	Blue John Creek	(Below Dam)

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* Data based on Inventory of Water Pollution Control Facilities, Vol. I, Cities and Counties, Georgia Water Quality Control Board, March 1971.

TABLE II

SOURCES OF INDUSTRIAL POLLUTION*

Location	Name	Type of Industry	Type of Waste	Remarks
Atlanta	Sonoco Products	Paper Repulping	Process Waste	Has fiber recovery. Will discharge to the expanded R. M. Clayton secondary treatment plant when it becomes operational.
Atlanta	Municipal Incinerator	Waste Incineration	Non-combustible Residues	Discharges to two large settling basins, cleaned alternately. Elemental analysis showed (mg/l of total suspended plus dissolved fractions): Zinc 2.3, Lead 2.0, Manganese 2.2, Aluminum 31.2, Iron >6.2.
Newnan	Wm. L. Bennell Co.	Aluminum Anodizing	Acid, Cr, Al	Waste treatment is inadequate. Has an equalization pond, but acid discharges still occur. Effect on receiving creek is severe but effect on Chattahoochee is difficult to measure.
Newnan	Ga. Power Co. (Yates Plant)	Electrical Generators	Hot Water	Has no cooling towers, will be in violation if Ga. water quality standards are changed to allow a 5°F maximum temperature rise.
Franklin	Franklin Aluminum Co.	Aluminum Anodizing	Acid, Cr, Al	Waste treatment is inadequate. Not in compliance with Ga. Water Quality Control Board.

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* Information supplied by Georgia Water Quality Control Board

STUDY METHODS

SAMPLING STATIONS

Thirteen sampling stations were established for the study on the Chattahoochee River and its principal tributaries between Franklin and West Point, Georgia. Eight stations were established in the main river channel; the remaining five were in the tributaries along this 35-mile stretch of the Chattahoochee.

Chemical, biological and bacteriological sampling sites coincided as closely as was physically possible. Cross-section samples at third points were collected at all the Chattahoochee River sites except Station 7. In the tributaries and at Station 7 mid-channel samples were taken. During the summer reconnaissance it was determined that sufficient mixing precluded the need for more than one sample. All water samples were collected at a depth of one foot. The location of these sampling stations is shown in Figure 3 (end of report). A description of the locations is presented in Appendix B.

SAMPLING SCHEDULE

Originally, two sampling periods were selected for this study. Based on previous weather records, a late summer period (August 10-21, 1970) was established to determine conditions of low-flow, warm temperature, and a winter period (February 17-25, 1971) to determine conditions of high-flow, cold temperature. Because of unseasonable rainfall it was necessary to collect samples at three summer intervals (August 11-14; September 3-4; and September 14-18, 1970) to obtain adequate seasonal data.

Water samples for physical, chemical and bacteriological analyses were collected daily. A diurnal study at selected stations was conducted on September 17, 1970. Grab sampling techniques (one sample per day per station) were used for daily collections and hourly sampling was done for the diurnal study. Time of the daily sampling was staggered in order to complement the diurnal study. Samples for biological analyses were limited to an investigation per station per seasonal study.

PHYSICAL AND CHEMICAL ANALYSES

Measurements and analyses were performed either immediately upon collection at the sampling site, within a few hours of collection at the mobile laboratory in LaGrange, Georgia (Figure 13), or at the Southeast Water Laboratory in Athens, Georgia. The parameter studied, frequency of measurement and location where analysis was performed are presented in Table III.

The U. S. Geological Survey supplied flow measurements from their Chattahoochee River gage (mile 306.7).

BIOLOGICAL ANALYSES

For plankton analysis, surficial grab samples of water were collected twice at each station in the summer and once per station

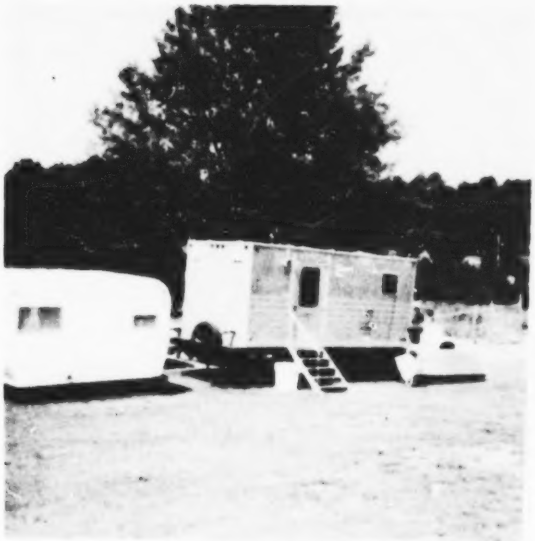

Figure 13. The Southeast Water Laboratory Mobile Unit at LaGrange, Georgia

TABLE III
PHYSICAL AND CHEMICAL ANALYSES

Parameter	Frequency Of Measurement	Where Determined
Physical		
Temperature	Daily & Diurnal	Field
Color	Daily	Mobile Lab
Turbidity	Daily	Mobile Lab
pH	Daily & Diurnal	Field & Mobile Lab
Conductivity	Daily	Mobile Lab
Chemical		
Total Dissolved Solids	Daily	Athens, Georgia
Suspended Solids	Daily	Athens, Georgia
Dissolved Oxygen	Daily & Diurnal	Mobile Lab
Biochemical Oxygen Demand	Selected Times	Mobile Lab
Alkalinity	Daily & Diurnal	Mobile Lab
Chloride	Daily	Mobile Lab
Nitrogen	Daily	Athens, Georgia
Phosphorus	Daily	Athens, Georgia
Total Organic Carbon	Daily	Athens, Georgia
Manganese	Daily	Athens, Georgia
Iron	Daily	Athens, Georgia

in the winter. Total phytoplankton counts (number/ml) were determined in the Southeast Water Laboratory.

Artificial substrate samplers were used to collect periphyton (Figure 14) and macroinvertebrates (Figure 15). Dipnet collections were made at each station for additional qualitative information. Analysis was done at the Southeast Water Laboratory.

BACTERIOLOGICAL ANALYSES

All bacteriological samples were collected at a depth of approximately one foot using a grab technique. Samples were placed in ice and analyses were initiated within six hours after collection.

Total coliform densities were determined using the membrane filter technique as outlined in _Standard Methods for the Examination of Water and Wastewater 13th Edition_ (7). The fecal coliform densities were determined using the membrane filter procedure of Geldreich _et al_ (8) (which employs M-FC broth and an incubation temperature of 44.5°C).

Qualitative determinations for the presence of _Salmonella_ were made at selected stations using the modified swab technique of Moore. (9) The swabs were suspended just beneath the water surface for a 3-5 day period, retrieved, placed in sterile plastic bags and returned to the laboratory for analysis. Swabs were placed into wide-mouth jars containing approximately 200 ml of 1 1/2 strength Tetrathionate Broth with brilliant green added (1:100,000 w/v). The inoculated enrichment was incubated for 18 to 24 hours at 41.5°C according to the procedure of Spino.(10)

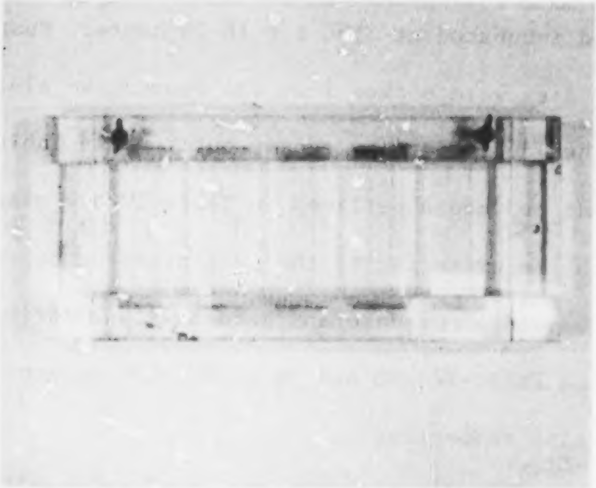

Figure 14. Artificial Substrate Used to Collect Periphyton.

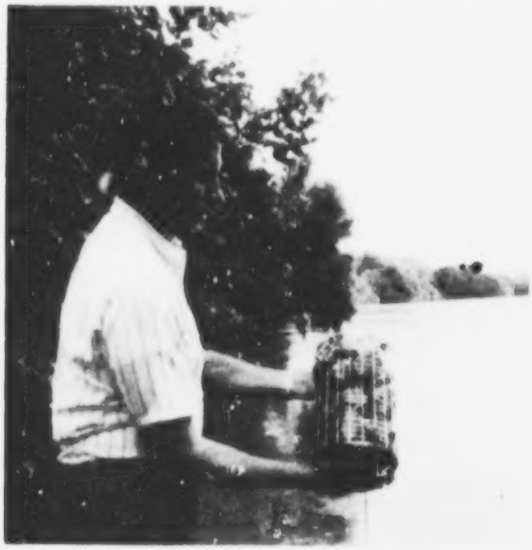

Figure 15. Artificial Substrate Used to Collect Macroinvertebrates.

After primary enrichment, an inoculum was streaked onto Bismuth Sulfite Agar (BS), XLD Agar, Taylor (XLD), and Hektoen Enteric Agar (HE) plates and incubated at 35°C for 18-24 hours. Suspected Salmonella colonies were picked from the respective plates and subjected to the identification scheme outlined in Table IV.

The methods and media outlined in Table IV are described by Ewing,(11) with the exception of the cytochrome oxidase and lysine decarboxylase methods. Oxidase and decarboxylase activity was determined using Patho-Tec-CO and Patho-Tec-LD* reagent impregnated paper strips respectively.

Definitive serological identification of Salmonella isolates was made at the Southeast Water Laboratory. The methodology used was the standard serological procedures described by Edwards and Ewing.(12) Verification of these identifications was made by the Enteric Bacteriology Unit of the National Center for Disease Control, Atlanta.

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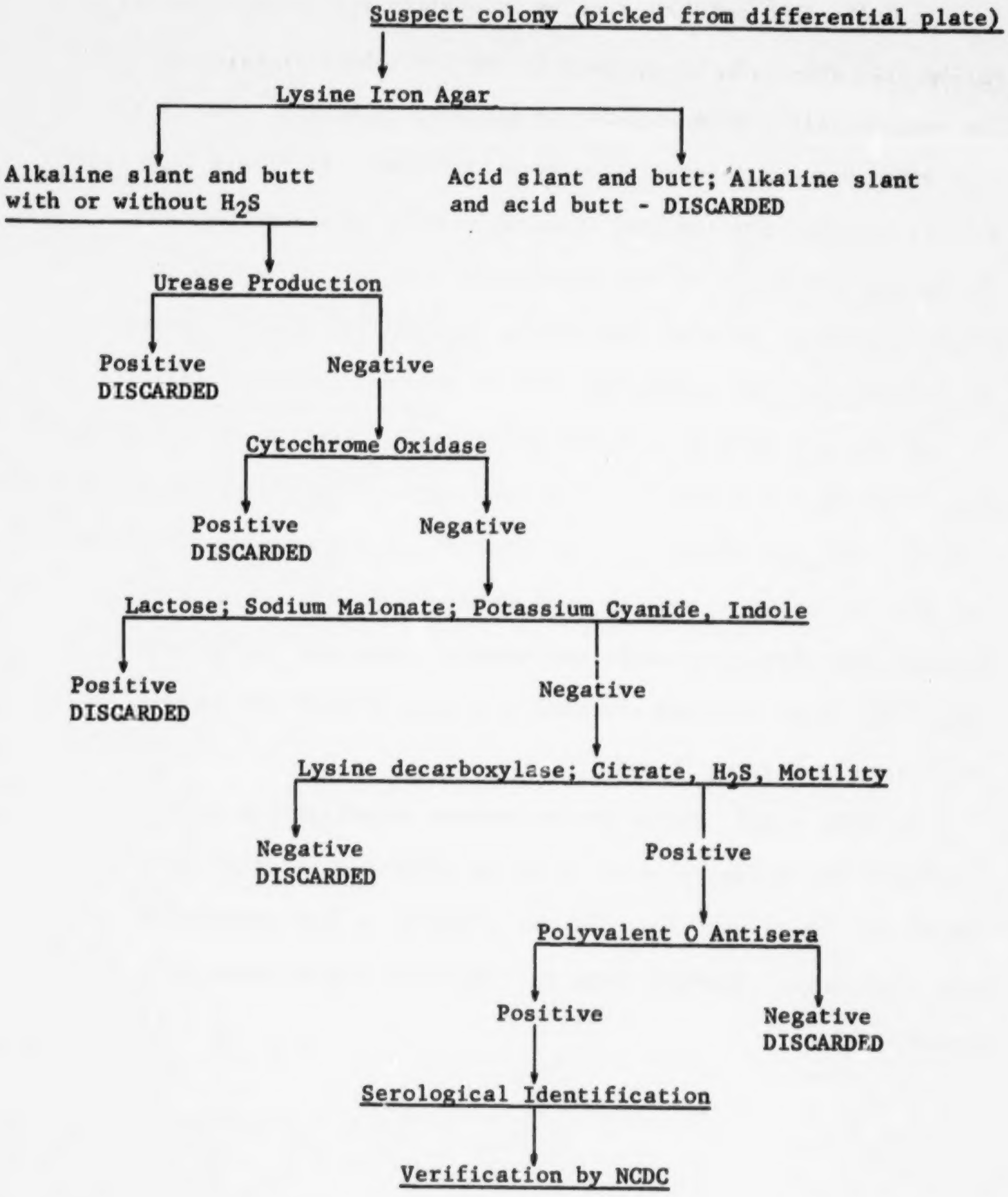
* Does not imply endorsement of this product.

TABLE IV

IDENTIFICATION SCHEME FOR SALMONELLA SUSPECTS


Suspect colony (picked from differential plate)
Lysine Iron Agar
Alkaline slant and butt with or without H_2S
Acid slant and butt; Alkaline slant and acid butt - DISCARDED
Urease Production
Positive DISCARDED
Negative
Cytochrome Oxidase
Positive DISCARDED
Negative
Lactose; Sodium Malonate; Potassium Cyanide, Indole
Positive DISCARDED
Negative
Lysine decarboxylase; Citrate, H_2S, Motility
Negative DISCARDED
Positive
Polyvalent O Antisera
Positive
Negative DISCARDED
Serological Identification
Verification by NCDC

STUDY FINDINGS

PREVIOUS STUDIES

In 1964, 1965 and 1966 some water quality data were collected by the U.S. Public Health Service in the Chattahoochee River Basin. Ten sampling sites were included in the area to be impounded by the West Point Dam. Data are in the form of "STORET" printouts depicting bacteriological, physical and chemical measurements (Appendix C). The bacteriological data are adequate for the periods and locations studied; however, data on most of the physical and chemical parameters are insufficient for comparison with postimpoundment conditions.

In January 1970, the Georgia Water Quality Control Board published data from their Chattahoochee River monitoring program for the calendar years of 1968 and 1969.(2) These chemical, physical and bacteriological data are based on monthly grab samples from eight sites in the Chattahoochee between Atlanta and Franklin, Georgia. Dissolved oxygen and fecal coliform profiles from that program are reproduced here as Figures 16 and 17.

In 1965, a U.S. Public Health Service investigation briefly described the biological quality of the river and selected tributaries.(3) The report included two stations in this preimpoundment study area: Station 9 and 12. Excerpts can be found in Appendix D.

FIGURE 16

DISSOLVED OXYGEN PROFILES UPSTREAM FROM WEST POINT SITE
(FROM GEORGIA WATER QUALITY BOARD)

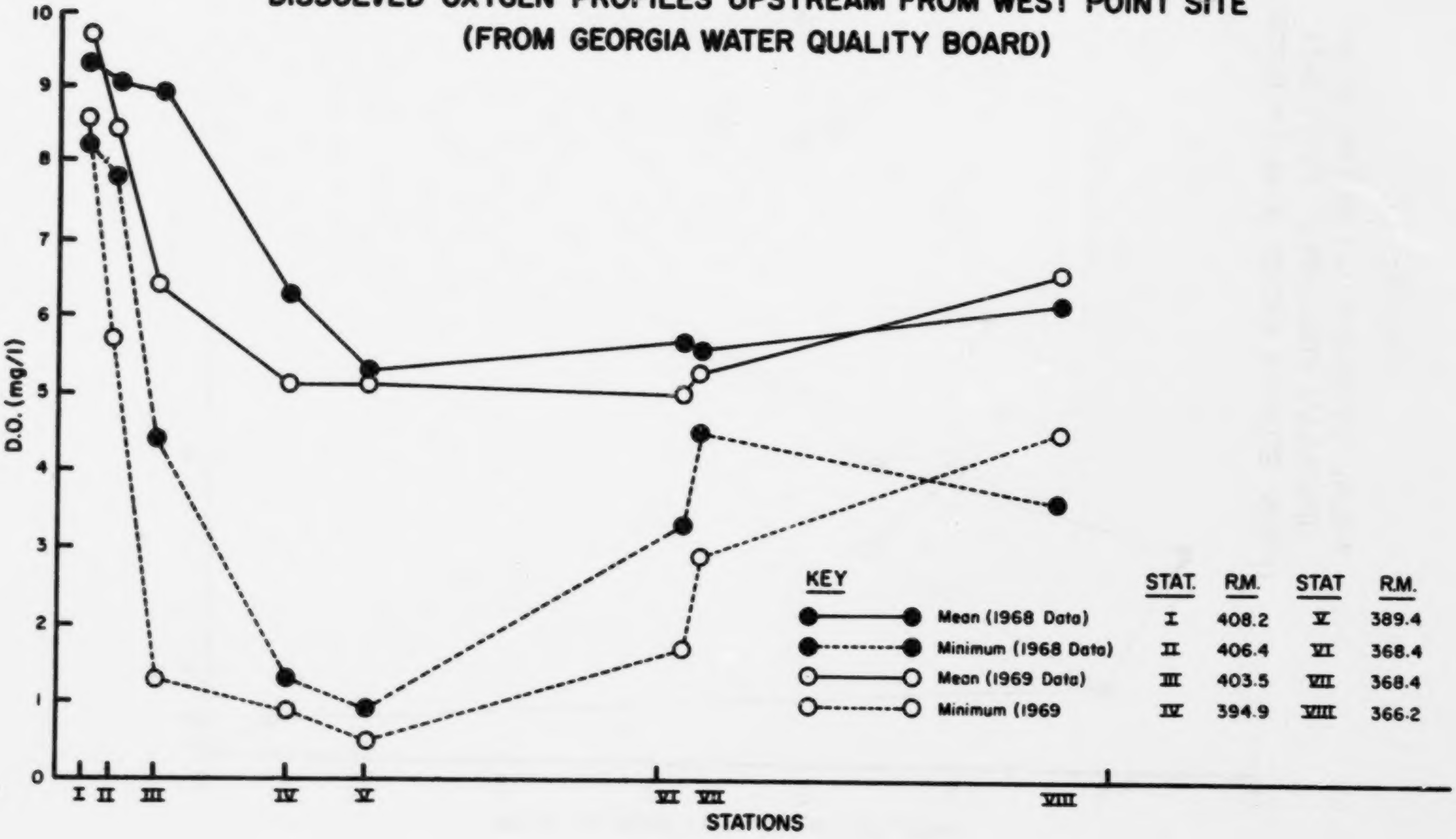
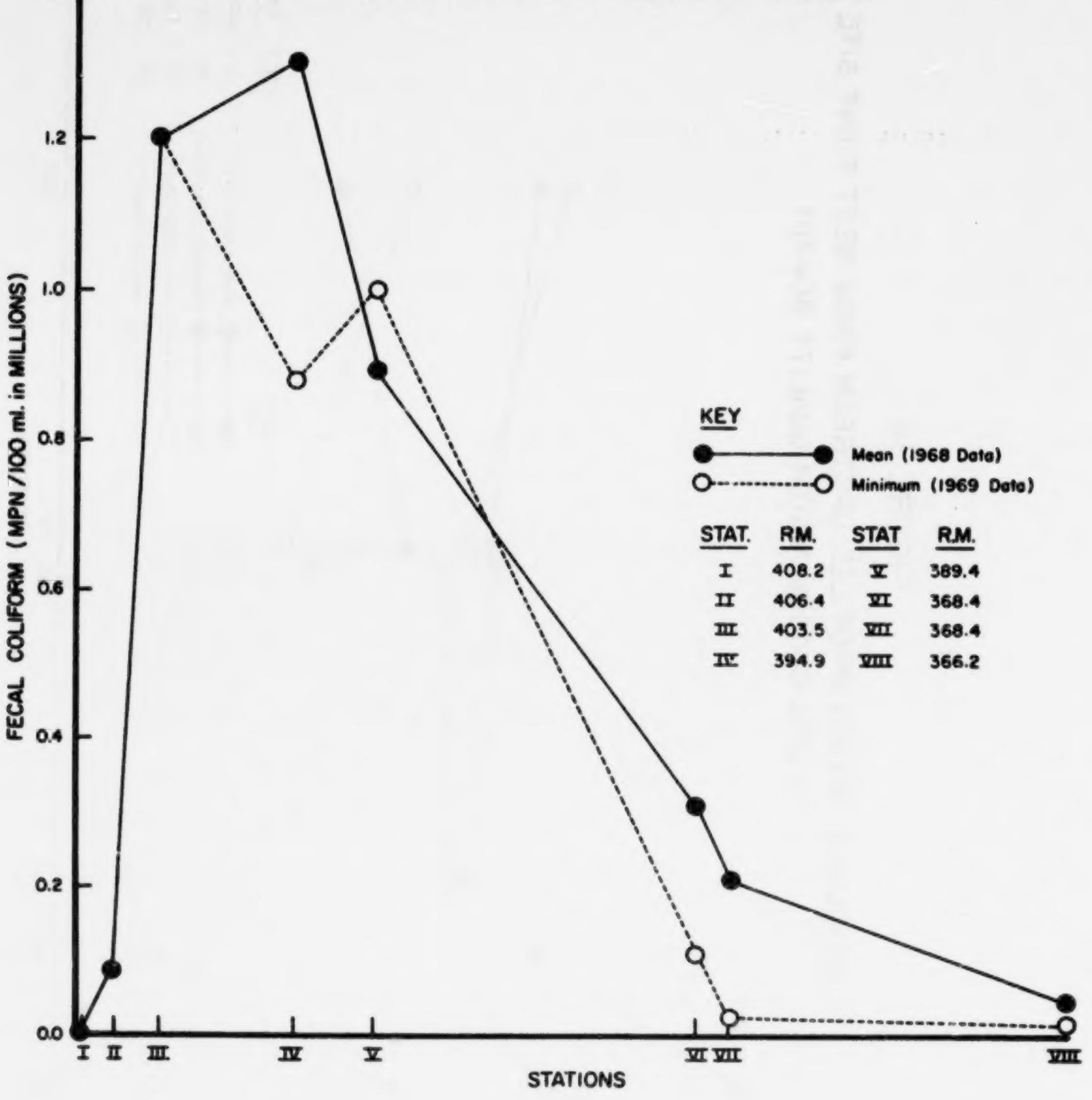


FIGURE 17

FECAL COLIFORM - GEOMETRIC MEANS
UPSTREAM FROM WEST POINT SITE
(FROM GEORGIA WATER QUALITY BOARD)



1970-1971 STUDIES

Survey data from the summer and winter preimpoundment studies are discussed together in this section to facilitate comparisons. A tabulation of certain statistical values for the water quality parameters measured is presented in Appendices E and F.

RAINFALL AND RIVERFLOW

Annual precipitation in the study area is 55.61 inches. Distribution is relatively even throughout the winter, spring and summer months. Records show 28 to 29 percent of the rain falls during each of these seasons. The dry period is autumn when about 15 percent of the total rainfall occurs.

During the August survey, rainstorms slightly elevated the riverflow. Turbidity fluctuations and other problems associated with rainfall and runoff resulted in the postponement of the second week of the summer, low-water level, study until September. Minor showers occurred during the other survey periods but they caused no major problems. Daily rainfall data for the summer and winter survey periods are presented in Table V.

River discharge was measured by a Corps of Engineers gage on Highway 27 near Franklin, and a USGS gage at Highway 29 near West Point, Georgia. Figure 18 shows that streamflows in August and September were very close to the annual average flow of 4000 cfs, in spite of the unseasonable rainfall. Flows during the winter survey were far above the average flow. Large weekly fluctuations during the low water study were closely correlated with dam releases from upstream reservoirs.

CORRELATIONS OF FLOW WITH WATER QUALITY PARAMETERS

Fluctuations in several parameter concentrations appear to correlate closely to streamflow fluctuations. The mechanism involved is presumably suspension of sediment or flushing of land surface and isolated bodies of water. Parameters that matched flow variations fairly closely include: turbidity, total iron, total solids, dissolved solids, total phosphates, total manganese, total organic carbon and -- to a slight extent -- chlorides (Appendices E and F).

Both total and fecal coliforms (as shown for Station 12 in Figure 18a) and total Kjeldahl nitrogen (Appendices E and F) matched flow to some extent, yet showed independent variations also. Ammonia concentrations increased with initial rises in stream flow and then dropped quicker, or to a greater extent, than did streamflow. This could be contributed to the scrubbing effect of the atmosphere by heavy rains. Dilution had apparently become significant after initial flushing.

In terms of total quantities of pollutants discharged, those whose concentrations increased with flow were even more significant. Or, illustrating this point in a different way: Figure 18a shows concentration of fecal coliform on February 23 and 25 of 21,000 and 33,500 per 100 ml, respectively. However, in terms of total quantities (the products of flow and concentrations); the February 23 data represents a 25 percent greater amount than does February 25.

FIGURE 18
STREAM FLOW DURING THE SURVEY PERIODS

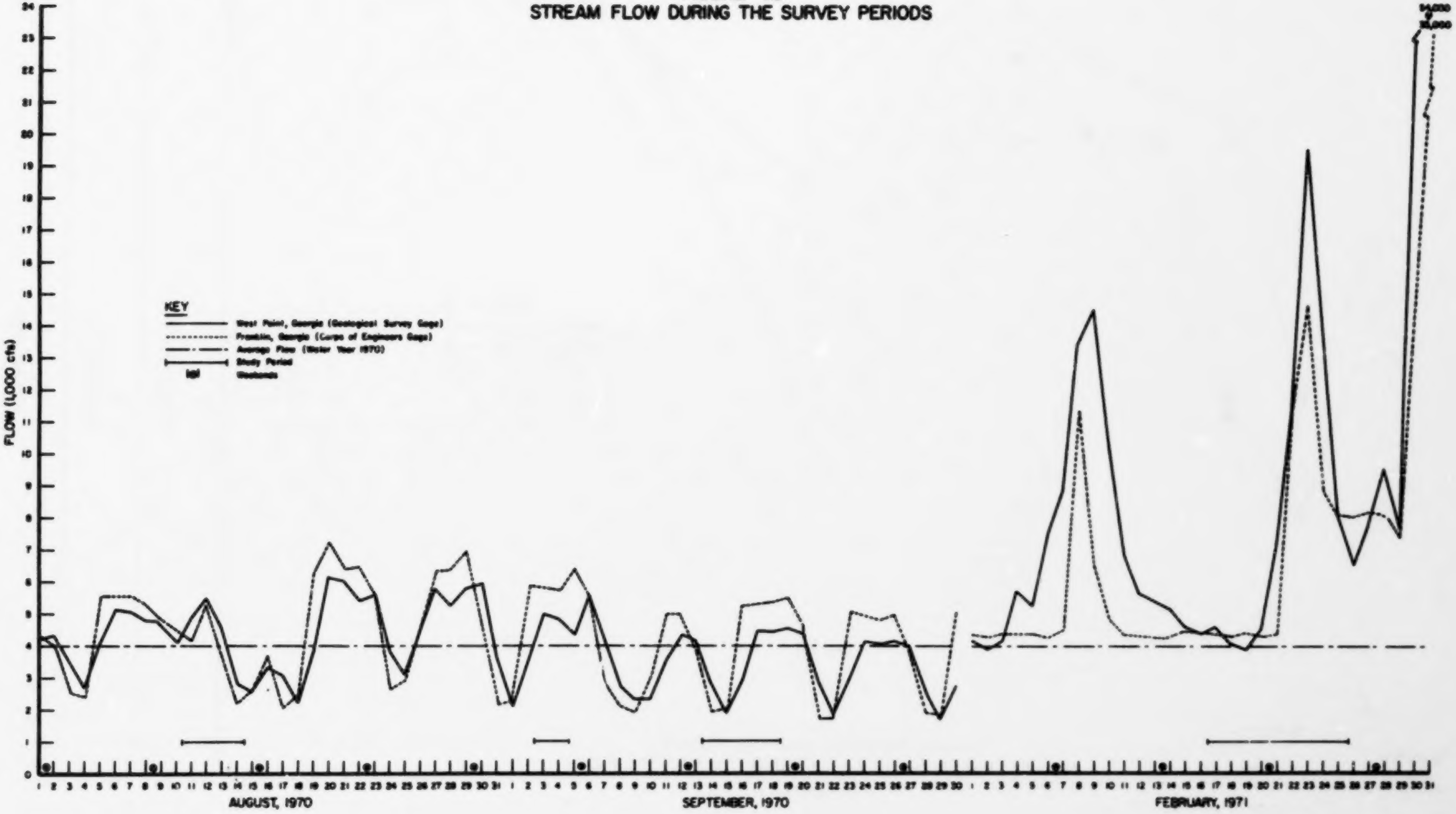


FIGURE 18A

COLIFORM COUNTS (AVERAGE OF LEFT AND RIGHT BANKS)
OF STATION 12 AT FRANKLIN, GEORGIA

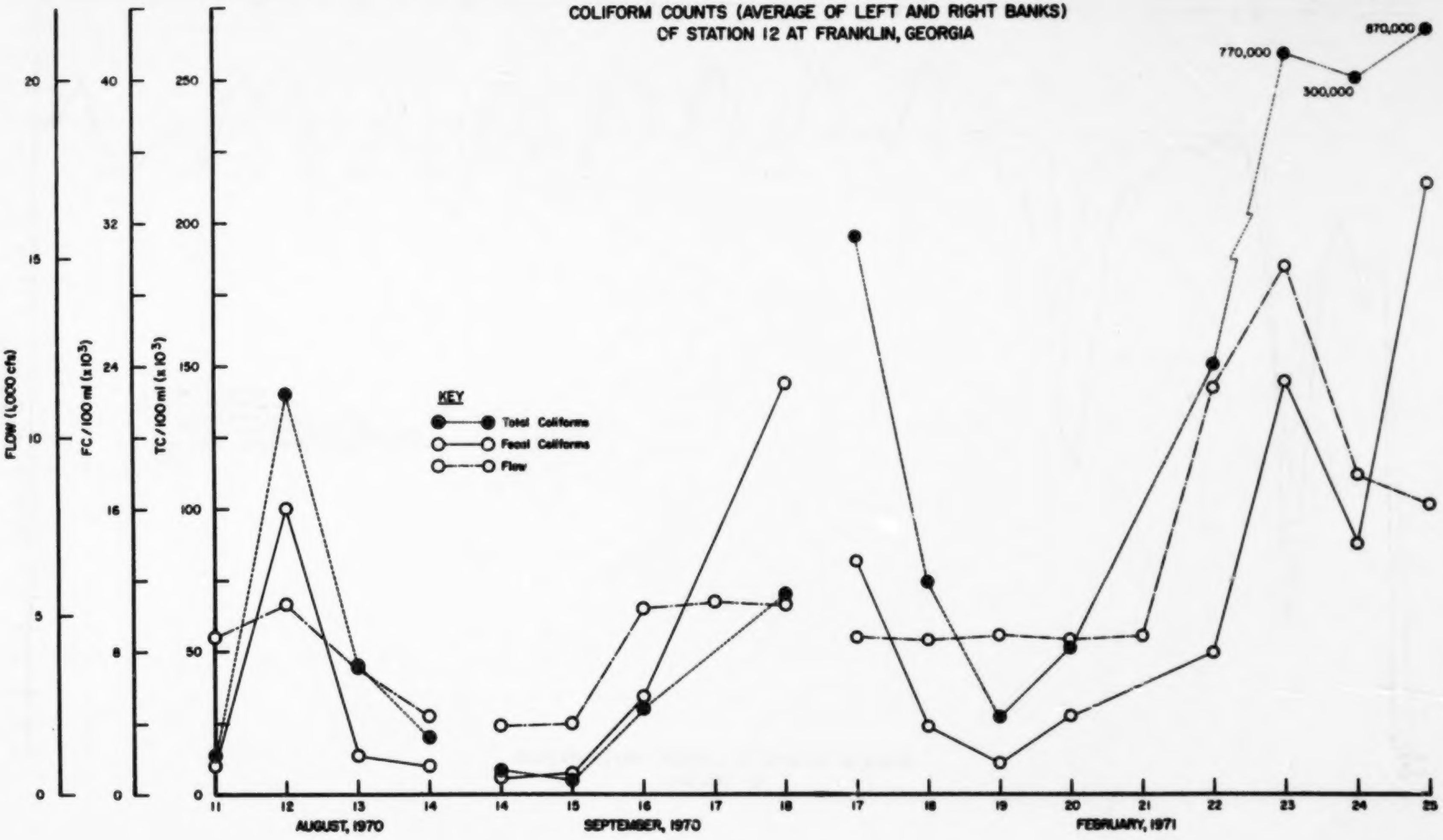


TABLE V

RAINFALL DATA*
(Inches)

Day of Month	August 1970	September 1970	February 1971
1	0	0	0
2	0.09	0	0
3	0	0.60	0
4	0.13	0	0.35
5	0.43	0.04	0.85
6	0	0.25	0
7	0.17	0.11	1.03
8	0	0.80	0.80
9	0.05	0	0
10	0.95	0	0
11	0.48	0	0
12	T	0	0
13	0.20	0	0.52
14	0	0	1.63
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0.09	0	0
20	0.48	0	0.74
21	0.28	T	0.34
22	T	0	1.25
23	0	0	0.05
24	0.47	0	0
25	0	0	0
26	0	0	0
27	0	0	0.83
28	0.10	0	0
29	0.05	0	-
30	0	0	-
31	0	-	-

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* From the National Climatic Center, LaGrange, Georgia.

T represents a trace measurement for rainfall.

TEMPERATURE

The study area is located in a temperate climate characterized by short, mild winters and long, warm summers. Extremes include temperatures approaching zero in winter and summer heat waves approaching 100°F.

Water temperatures reflected the seasonal air temperature changes and to a lesser degree the summer shading effect of overhanging shoreline vegetation. Water temperature in the main Chattahoochee channel had the most variation. Measured temperatures ranged from 21 to 28°C in summer and from 10 to 15.5°C in winter. Shallow tributaries that were heavily shaded during the summer had slightly lower water temperatures, measurements ranged from 21.5 to 26°C. In the winter the water temperature in the shallow tributaries was closely correlated with changing air temperatures. Measured temperatures ranged from 8 to 15.5°C (Figure 19).

COLOR AND TURBIDITY

The Chattahoochee River and its tributaries, the New River, Yellowjacket Creek and Wehadkee Creek, from mile 343.1 to 306.7 were low in color. Values ranged from 10 to 50 units* at all stations during both warm and cold weather phases of the study. Water color was caused by both organic and inorganic sources. This judgement was based upon the fact that humic materials were observed in abun-

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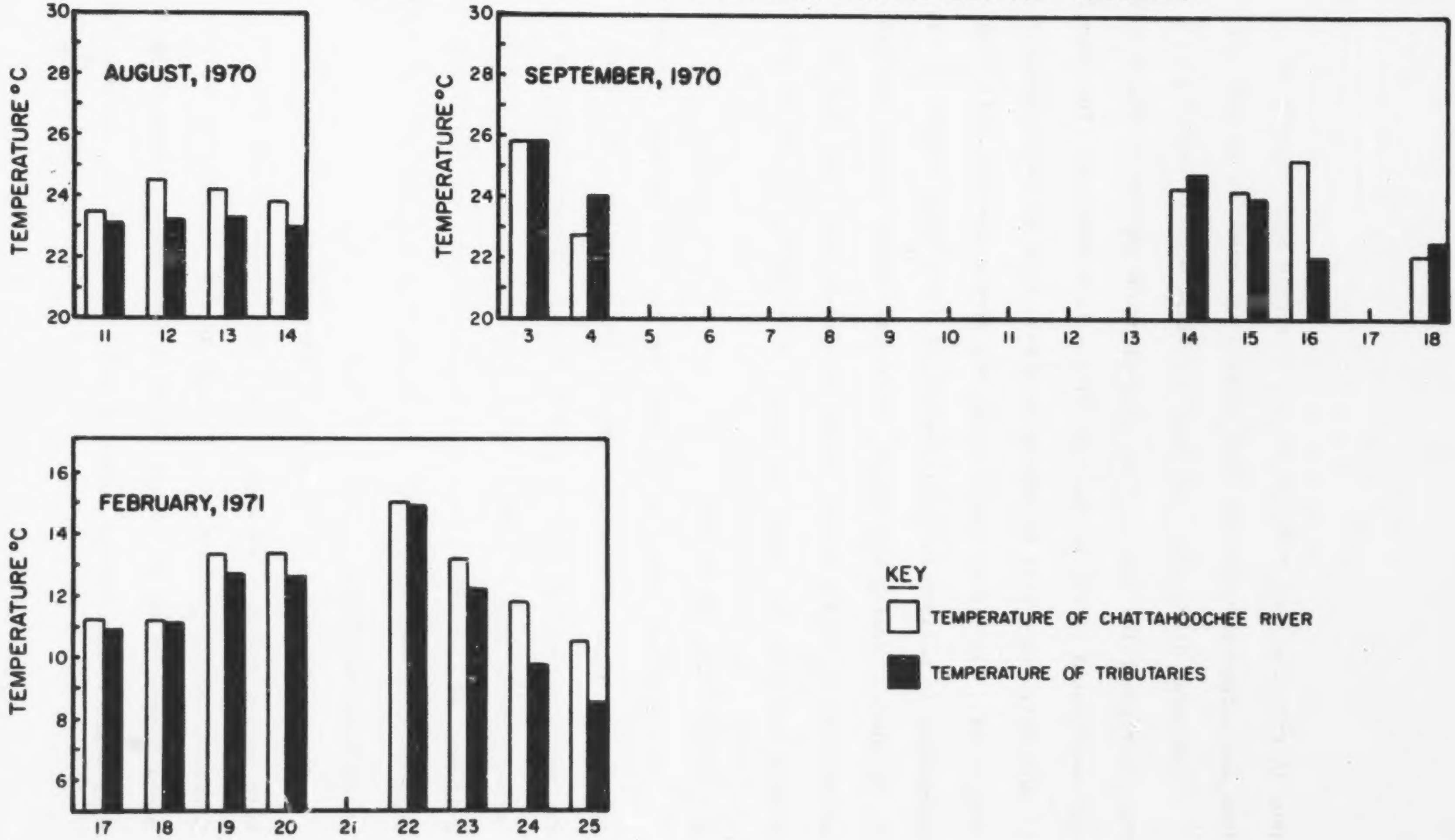
* One exception - a value of 65 color units was recorded in Yellowjacket Creek at Station 8 on February 23, 1971.

FIGURE 19

AVERAGE WATER TEMPERATURE DURING SURVEY PERIODS



ance in the river and tributaries and inorganic sources such as iron and manganese compounds were present in excessive amounts also.

Suspended silt, clay, and finely divided organic matter made the river generally turbid. The phytoplankton population was sparse and contributed little to the turbidity values observed. The amount of turbidity fluctuated depending on stream flow and meteorological conditions. Rainstorms that delayed the summer sampling reflected themselves in maximum turbidity values of 125 Jackson Candle units. In the winter, during high-flows, turbidity values reached maximums of 250 Jackson Candle units. Normally, values were less than 50 Jackson units in the summer but were nearly doubled in the winter.

pH, CONDUCTIVITY AND SOLIDS

The pH values never varied more than 0.7 of a pH unit from neutrality. In highly productive waters, high pH values often occur as the photosynthetic process of aquatic plants converts carbonate to carbon dioxide thus increasing the hydoxide content. The lack of a diurnal pH elevation in the Chattahoochee River and its tributaries suggests that photosynthetic activity was insufficient to cause such an equilibrium shift.

Low conductivity values were recorded at all stations during both survey period. Wehadkee Creek (Station 4) had the lowest dissolved mineral content as reflected by its conductivity measurements (summer 44 to 69; winter 26 to 42 µmhos/cm). Elsewhere, average warm weather measurements ranged from 57 to 84 µmhos/cm while average cold weather results were lower, 33 to 59 μmhos. The slightly lower values in Wehadkee Creek indicated that it was the only stream under study that was not receiving an industrial or domestic waste load.

Total dissolved solids were low but variable. In August and early September 1970, intermittent rainstorms and upstream reservoir releases caused unstable streamflow. These conditions were reflected in the wide range of dissolved solid values, from 9 to 172 mg/1. The third warm weather study, September 14-18, 1970, was conducted while more stable streamflow conditions prevailed, and dissolved solids ranged from 8 to 81 mg/1. These data were more characteristic of the solids content to be expected during a warm, dry period. In February 1971, streamflows fluctuated widely, and the dissolved solids ranged from 27 to 128 mg/1 which was a smaller range than during the first summer-study period.

Suspended solids somewhat paralleled the dissolved solids. During the summer rainy period, suspended solids ranged from 19 to 90 mg/1. Cold weather samples reflected unstable streamflow conditions with range values of 2 to 874 mg/1.

DISSOLVED OXYGEN AND BIOCHEMICAL OXYGEN DEMAND

In view of the considerable amounts of waste entering the Chattahoochee River (Tables I and II), the dissolved oxygen (DO) and five-day biochemical oxygen demand (BOD_5) were significant parameters.

The DO and BOD_5 values obtained in the August and the early September study were not representative of low-water, warm weather conditions. Heavy rainfall and frequent water level fluctuations because of the upstream reservoir releases caused as much as a 1.0 mg/l increase in the DO and caused a modification in the BOD_5 results. The data show a slight DO depression at Station 12 (4.5 mg/l) when compared to samples collected downstream (range: 5.0-8.0 mg/l). The mid-September study was done during a representative period of relatively warm weather with stable low-water conditions.

Dissolved oxygen values as low as 3.4 mg/l were recorded at Station 12 in mid-September (43 percent saturation). Downstream measurements showed the riverwater was being reaerated. Summer DO content of samples from Station 10 and downstream ranged from 5.0 to 8.8 mg/l; no values less than 62 percent of saturation was recorded. The September studies also showed that the BOD_5 was being diluted and/or assimilated with downstream water travel. Average BOD_5 values of 1.5 and 2.0 mg/l at Stations 12A and 12B, respectively, were reduced to 0.7 and 0.4 mg/ at Stations 10A and 10B, respectively. Values continued at these concentrations (or slightly less) downstream.

The cold weather survey was done at approximately the annual peak flow period. High streamflow and the increased solubility of oxygen in cold water resulted in DO concenrations at all stations ranging from 4.6 to 11.5 mg/l. The BOD_5 values increased during the unstable, high-water conditions to a high of 5.7 mg/l.

ALKALINITY

Total alkalinity concentrations did not exceed 36 mg/l as $CaCO_3$ and the average value for most stations was about 15 mg/l as $CaCO_3$. This low buffering capacity existed during both seasonal studies. Hardness was not measured, but previous records of the Georgia Water Quality Control Board showed that a close correlation between alkalinity and hardness existed in the Chattahoochee River(13). Thus suggested that most water hardness in the basin is carbonate hardness.

CHLORIDE

Chloride values were far below concentrations likely to cause a problem in the proposed reservoir. Measurements ranged from 2 to 10 mg/l.

NITROGEN AND PHOSPHORUS

Much research has been directed at the importance of major nutrients such as nitrogen and phosphorus (or their components) in promoting vegetative production. Nitrogen analyses made in this study included the measurement of ammonia, (NH_3), nitrite + nitrate (NO_2+NO_3) and total Kjeldahl nitrogen (TKN). Results showed organic nitrogen (TKN minus NH_3) and inorganic (NH_3 plus NO_2 and NO_3) nitrogen levels were appreciably lower in the summer than in the winter. Summer concentrations of organic and inorganic nitorgen ranged from 0.118 to 0.240 mg/l and from 0.341 to 1.206 mg/l, respectively. The summer data reflected utilization by plant growth; none of the values are abnormal for surface waters in this section of the United States.

Phosphorus analyses included a measurement of total and soluble phosphorus. Results indicated a slight seasonal variation in total phosphorus levels. Summer results, in the main river channle, ranged from 0.17 to 0.76 mg/1 while winter results ranged from 0.15 to 0.98 mg/1. Tributaries generally had lower concentrations (e.g., 0.01 to 0.08 mg/1 in Wehadkee Creek). The upper limit of the ranges recorded for the river were in excess of suggested allowable limits (0.1 mg/1 in flowing streams and 0.05 mg/1 P where waters enter a lake) (14). Although nuisance phytoplankton growths were absent in 1970 and 1971, there is a possibility that they may occur in the impoundment. Of course, nutrients are necessary for high fish production and this benefit must be balanced against other disadvantages.

TOTAL ORGANIC CARBON

The importance of organic compounds in plant nutrition is not well known. Certain plants and animals are thought to utilize simple organic compounds such as dissolved carbon, while bacteria are capable of utilizing the more complex forms. In spite of incomplete knowledge about the nutritional role of carbonaceous materials, excessive amounts have been associated with nuisance growths and other water pollution problems.

Water samples from the proposed impoundment watershed were tested for total organic carbon content (TOC). The highest summertime TOC value, 13.0 mg/1, was recorded in August at Station 6 in the Chattahoochee River at the mouth of Yellowjacket Creek. In the past, Yellowjacket Creek had received a substantial amount of untreated or partly treated domestic and textile industry wastes. At present most of these wastes are treated, and TOC values reflect the improved water quality conditions. Other summertime TOC values ranged from 2 to 11 mg/l. The winter survey results were similar. Ranges in TOC were 1 to 14 mg/l. Presently, these values seem to be causing some problems. At Station 6 and in Yellowjacket Creek, August data showed that 71 to 92 percent of the attached algae (by number) were filamentous blue-greens. A similar, but unexplained condition existed in Wehadkee Creek where maximum TOC values reached 10.0 mg/l. If upstream wasteloading is continued, an imbalance in nutrients will occur and nuisance blue-green algae growths can be expected.

IRON AND MANGANESE

Trace metals such as iron, manganese, molybdenum, cobalt, zinc, etc. are present in all natural waters and are required in small amounts in the metabolic process of plants. Iron and manganese are of special concern in impoundment waters because of their potential increase in solubility under reducing (anaerobic) conditions, resulting in a build-up of dissolved forms. The dissolved forms, if excessive, produce an objectionable taste, stain laundry, support undesirable bacterial growths (i.e., from iron bacteria), and generally deteriorate water quality.

The multiple water uses planned for the Chattahoochee River within and downstream from the West Point Lake include municipal potable water supply and process water supply for the textile industry. It is desirable for municipal supplies that both iron and manganese levels, in the dissolved form, remain at very low concentrations (<0.3 mg/l for iron and <0.05 mg/l for manganese in finished water) so as not to interfere with consumer use.

In the summer, particulate iron values averaged from 1.453 to 5.530 mg/l and particulate manganese averaged from 0.117 to 0.232 mg/l. Winter values were generally higher and averaged from 1.200 to 14.290 mg/l for iron and from 0.030 to 0.430 mg/l for manganese. The highest value for particulate iron (73.0 mg/l) was found in near flood conditions in February, and probably represents suspended sediment. Much of this may become soluablized during and after impoundment.

Dissolved fractions of these metals generally followed a similar trend, that is, cold weather averages were generally higher. However, the highest single sample concentrations for dissolved iron (0.8 mg/l) and dissolved manganese (0.440 mg/l) were recorded in September at Station 2 -- below the dam site -- and Station 4 in Wehadkee Creek, respectively. These values exceeded concentrations levels suggested as maximums for potable and textile-process water use. It is essential that the Corps of Engineers in cooperation with appropriate state agencies maintain surveillance of these parameters as the reservoir is filled and after impoundment, because the preimpoundment levels indicate water quality problems are probable in the proposed lake.

DIURNAL STUDIES

An intensive sampling schedule was established for one day during the summer study. Four stations (5, 6, 10, 12) were sampled hourly from 7:00 a.m. to 7:00 p.m. Samples were analysed for pH, alkalinity, DO and temperature. In conjunction with other grab sample data, these hourly analyses were useful in developing a representative record of quality. Diurnal variations for each parameter are graphically shown in Figure 20. More detailed data are given in Appendix B.

PHYTOPLANKTON

Nutrients in the Chattahoochee River were obviously being assimilated by plant forms other than phytoplankton. The total population of the free-floating algae did not exceed 600 cells/ml. In the late summer study, the population values ranged from 33 to 495 cell per milliliter. Winter study ranges from 80 to 583 cells per milliliter. With such low densities, seasonal variations were not clear. The summer and winter plankton data are graphically compared in Figure 21. More detailed phytoplankton data are presented in Appendix H.

PERIPHYTON

Study of the periphyton community revealed that the river's greenish discoloration was due to masses of attached algae often referred to as periphyton. The algal coating of submerged rocks generally decreased from station-to-station downstream. Table VI shows the relative abundance and biomass of periphyton in the study area.

Comparison of summer and winter data clearly showed seasonal variation. In late summer, the nuisance-producing blue-green algae

FIGURE 20

AVERAGE HOURLY QUALITY VARIATIONS AT STATIONS 5,6,10 & 12
SEPTEMBER 17, 1970

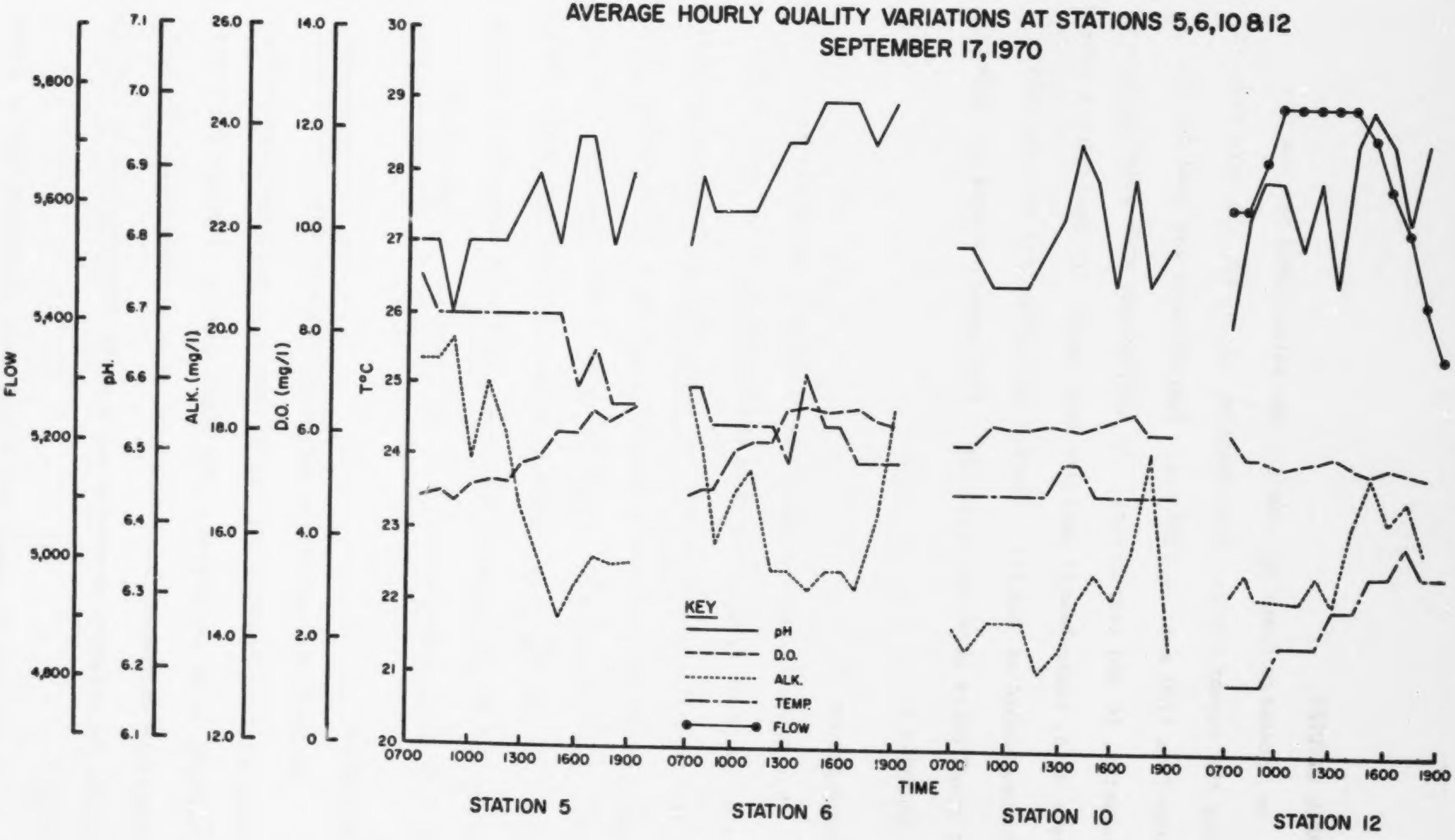


FIGURE 21

COMPARISON OF AVERAGE TOTAL PHYTOPLANKTON POPULATIONS (SUMMER AND WINTER SURVEY PERIODS)

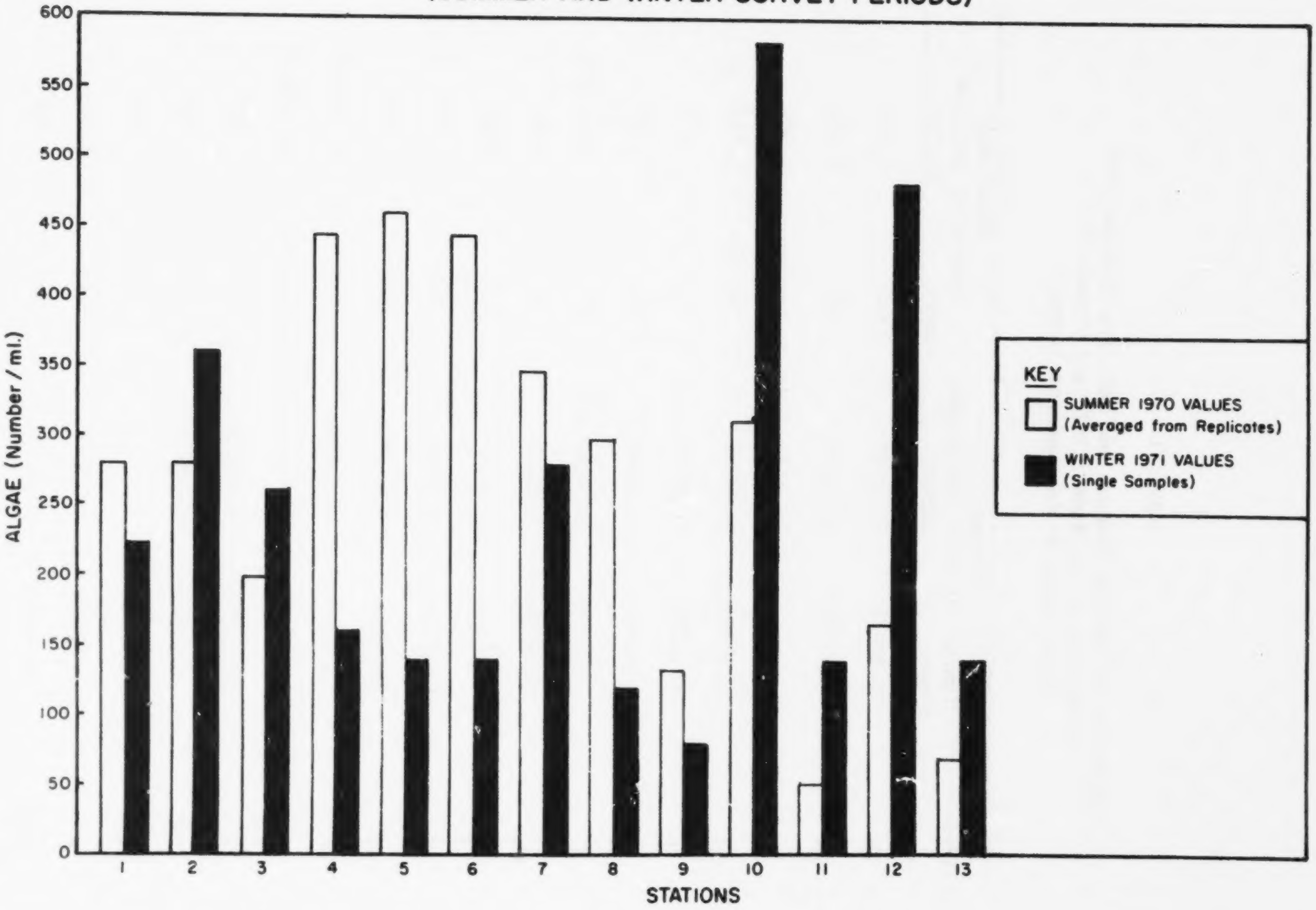


TABLE VI

Comparison of Average Biomass and Relative Abundance of Periphyton in the Summer 1970 and Winter 1971 (West Point Preimpoundment Survey)

Station *	Biomass (gm/m^2 ash free dry weight)		Abundance (number of cells/mm^2)	
	Summer	Winter	Summer	Winter
IL	24.88615	0.00261	2,041	1,132
IR	4.48000	0.01248	965	1,061
2L	no sample	0.00931	no sample	5,599
2R	12.81846	0.00199	22	3,447
3L	0.84293	0.00144	312	673
3R	32.62153	0.00052	531	288
4	5.97230	no sample	676	no sample
5L	23.26769	0.00253	1,064	2,784
5R	87.58769	0.00143	411	2,605
6L	13.07384	0.00088	543	43
6R	25.33230	0.00590	224	7,073
7	1.99692	no sample	408	no sample
8	no sample	no sample	no sample	no sample
9	13.22153	0.00155	335	325
10L	8.96923	0.00629	no sample	463
10R	1.55384	0.00743	648	309
11	2.55076	0.00618	14	1,114
12L	8.70153	0.00476	263	535
12R	127.12000	0.01868	89	1,627
13	6.32307	0.06925	353	540

* L represents left shore facing upstream.
* R represents right shore facing upstream.

dominated certain stations (Table VII). Winter samples showed diatoms were dominate (Table VIII). This cyclic trend is normal, but the amount of periphyton build-up reflected very nutrient rich waters.

Table VII
Periphyton Population at Sampling Stations
in the Chattahoochee River and Tributaries
(August 1970)

SAMPLE LOCATION		ALGAE (number per mm^2)										INERT DIATOM SHELLS	
		TOTAL ALGAE	BLUE GREEN		GREEN		FLAGELLATES (pigmented)		DIATOMS				
Station No.	Depth		Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate		Centric	Pennate
IR	Surf	965	0	0	3	7	0	0	13	942		4	125
1L	"	2,041	0	0	24	3	0	0	23	1,991		6	188
2R	"	22	0	0	0	0	1	0	9	12		1	6
2L	"	no sample	-	-	-	-	-	-	-	-		-	-
3R	"	531	2	0	0	0	0	0	69	460		17	153
3L	"	312	14	49	2	6	0	0	8	233		5	75
4	"	676	0	657	0	0	0	0	1	18		0	7
5R	"	411	0	114	4	130	0	0	15	148		7	98
5L	"	1,064	0	58	7	35	0	0	14	950		3	631
6R	"	224	0	158	0	37	0	0	10	19		1	18
6L	"	543	0	75	4	0	0	0	9	455		2	129
7	"	408	0	77	4	0	0	0	2	325		0	113
8	"	no sample	-	-	-	-	-	-	-	-		-	-

Table VII - Con't

SAMPLE LOCATION		ALGAE (number per mm^2)									INERT DIATOM SHELLS	
		TOTAL ALGAE	BLUE GREEN		GREEN		FLAGELLATES (pigmented)		DIATOMS			
Station No.	Depth		Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate	Centric	Pennate
9	Surf	14	0	0	0	4	0	0	0	10	0	7
10R	"	648	0	0	5	0	0	0	30	613	5	202
10L	"	no sample	-	-	-	-	-	-	-	-	-	-
11	"	14	0	0	0	4	0	0	0	10	0	6
12R	"	89	0	22	1	0	0	0	2	64	0	3
12L	"	263	0	0	0	0	0	0	13	250	2	84
13	"	353	0	0	6	0	0	0	0	347	0	54

TABLE VIII
PERIPHYTON POPULATION AT SAMPLING STATIONS IN THE CHATTAHOOCHEE RIVER AND TRIBUTARIES
(February 1971)

SAMPLE LOCATION		ALGAE (number per mm^2)									INERT DIATOM SHELLS	
		TOTAL ALGAE	BLUE GREEN		GREEN		FLAGELLATES (pigmented)		DIATOMS			
Station No.	Depth		Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate	Centric	Pennate
1R		1,061	0	0	3	6	9	0	0	1,043	0	31
1L		1,132	0	0	6	62	3	0	25	1,036	0	68
2R		3,447	0	25	6	37	6	0	0	3,373	0	80
2L		5,600	0	37	12	217	12	0	0	5,322	0	248
3R		288	0	2	6	6	1	0	7	266	0	20
3L		673	0	1	1	9	1	0	0	661	0	46
5R		2,605	0	19	0	62	25	0	130	2,339	0	340
5L		2,784	0	0	3	2,156	6	0	31	588	0	46
6R		7,073	0	31	37	99	12	0	111	6,781	0	223
6L		43	0	0	1	2	3	0	1	36	0	4
9		325	0	1	1	1	1	0	1	320	1	30
10R		309	0	1	1	2	2	0	1	302	0	6

TABLE VIII - Cont

SAMPLE LOCATION		ALGAE (number per mm^2)									INERT DIATOM SHELLS	
		TOTAL ALGAE	BLUE GREEN		GREEN		FLAGELLATES (pigmented)		DIATOMS			
Station No.	Depth		Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate	Centric	Pennate
10L		463	0	1	1	19	2	0	5	435	1	42
11		1,114	0	0	0	0	3	0	0	1,111	0	31
12R		1,627	0	0	19	322	6	0	0	1,280	0	130
12L		535	0	0	2	47	1	0	15	470	0	26
13		540	0	0	0	14	0	0	0	526	0	6

MACROINVERTEBRATES

Seasonal succession, water velocity and pollution were found to be three major factors that caused differences in the Chattahoochee River invertebrate community.

Seasonal distribution studies (15)(16)(17) have shown that there is no growing season common to all invertebrates, but generally populations are more diverse in the winter. Summer and winter populations are recorded in Appendix I.

The importance of water velocity on the invertebrate community was demonstrated by placing artificial substrates in pools and near riffles. Invertebrates collected in the pooled areas consisted almost entirely of midges and worms. In swift current areas, a diverse fauna of insects, crustaceans, molluscs, and worms were found in the substrate samplers. It was thought this information would be useful in predicting population changes when the river becomes impounded. Further discussion on this topic follows in the section titled, "Environmental Changes Following Impoundment."

Pollution from Atlanta's waters formed sludge beds downstream that covered portions of the Chattahoochee River's natural bottom. Profuse numbers of sludge worms were found in this deposit. Near the Highway 92 between Fairburn and Douglasville bridge, the sludge worm population was so dense that it gives a reddish-color to the river's shoreline.(18) Predatory leeches that feed on the worms abounded in the river near this bridge. The food web was simple -- organic materials were consumed by worms and the worms were eaten by leeches. As the food supply diminished, the leech population decreased. Comparison of the summer study biotic data from Station 12 with downstream stations showed this pattern of a decreasing leech population (Figure 22). During these

FIGURE 22

RELATIVE DENSITY OF CERTAIN INVERTEBRATES AT EACH STATION DURING THE SUMMER SURVEY

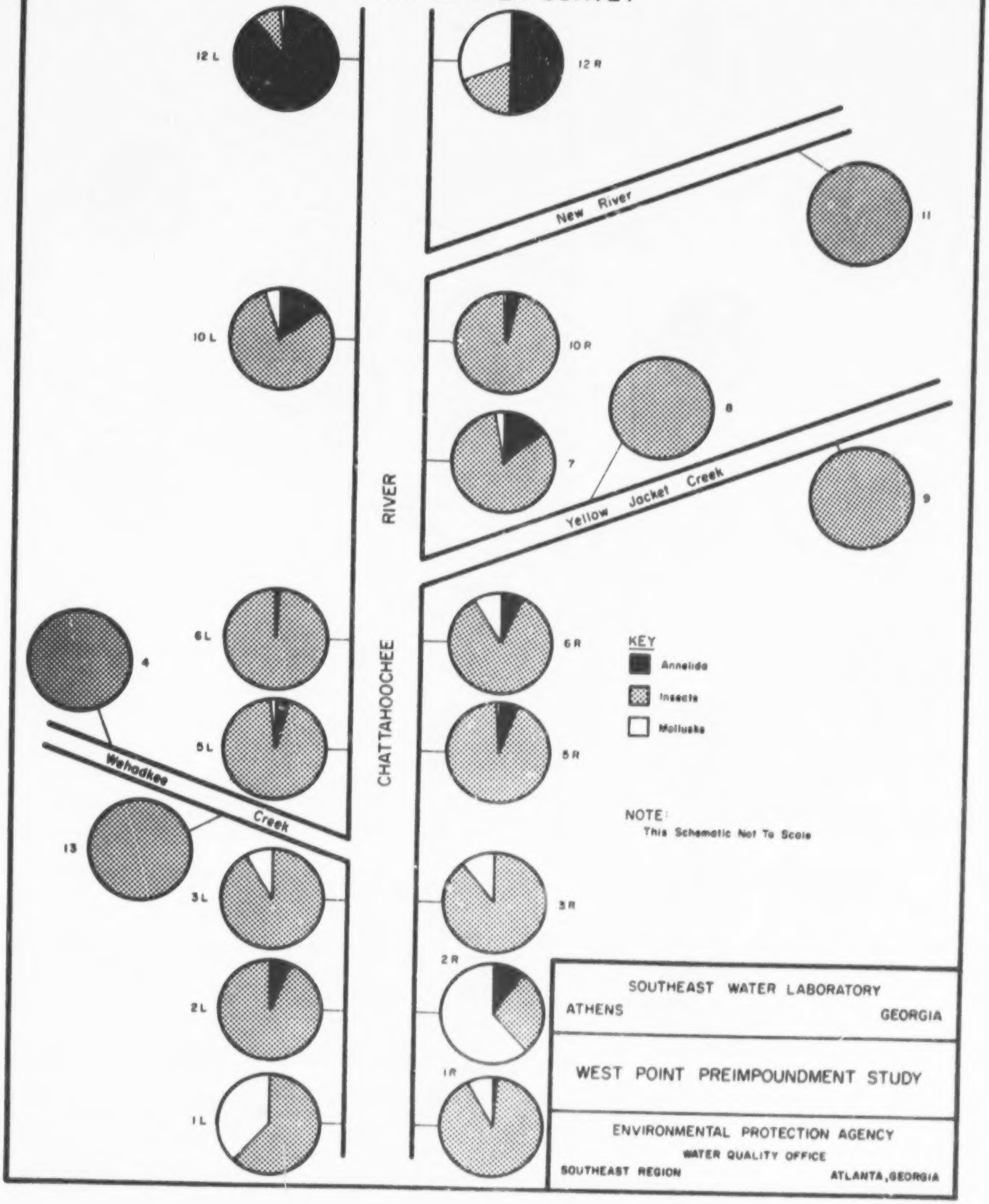
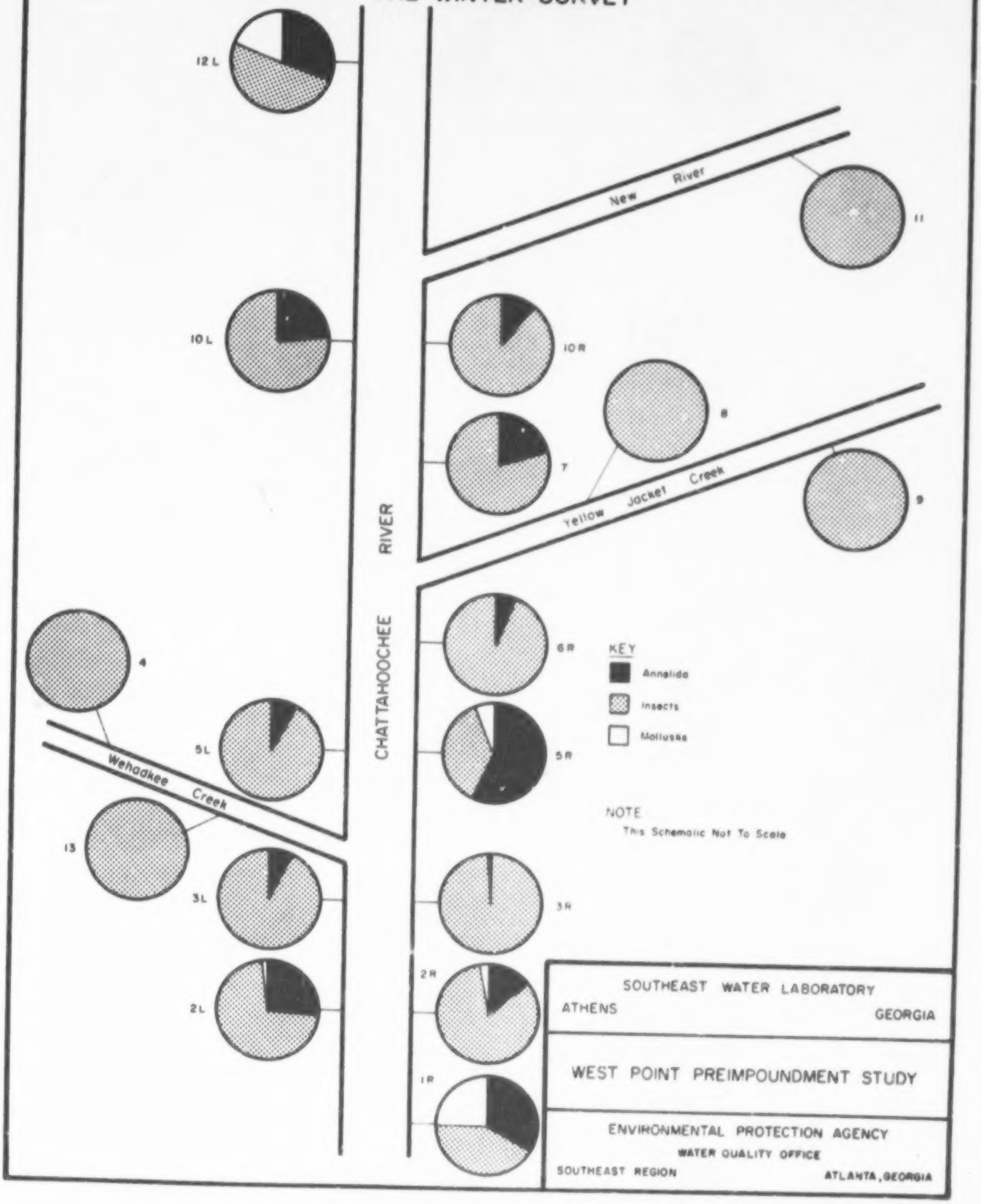


FIGURE 22A

RELATIVE DENSITY OF CERTAIN INVERTEBRATES AT EACH STATION DURING THE WINTER SURVEY



summer studies, a substrate sampler at Station 12 contained 143 organisms. Of these, 122 or 85 percent were leeches. This and other biotic data indicated Station 12 was a pollutional recovery area. About 10 miles downstream, another sampler (Station 10) contained 105 organisms and only 13 percent were leeches which indicated a relatively clean water zone.

Pollution is rarely reflected by the presence of absence of a single species or group. Yet in this study, the summer leech population clearly delineated the pollutional effect from Atlanta's industrial and municipal wastes. Winter time scouring and the dilution of wastes by the high water altered invertebrate populations making the pollution pattern indefinite.

COLIFORM BACTERIA

A total of 320 bacteriological samples were collected and analyzed for total and fecal coliform bacteria densities. These results are summarized in Table IX and graphically presented in Figures 23, 24 and 25.

The bacteriological quality of the Chattahoochee River within the study area was adversely affected by wastes being charged from the greater Atlanta area. The uppermost river station (Station 12, mile 343.1) had the highest mean total and fecal coliform densities throughout the studies. (Table IX and Figures 23 and 24.)

Additional waste from land runoff and treated domestic wastes from the City of LaGrange's Yellowjacket Waste Treatment Plant entered the river at mile 321.9. The steady decrease in the total and fecal coliform levels continued at the stations downstream of Franklin, Georgia (Station 12). (Figures 23 and 24.)

TABLE IX

BACTERIOLOGICAL DATA SUMMARY

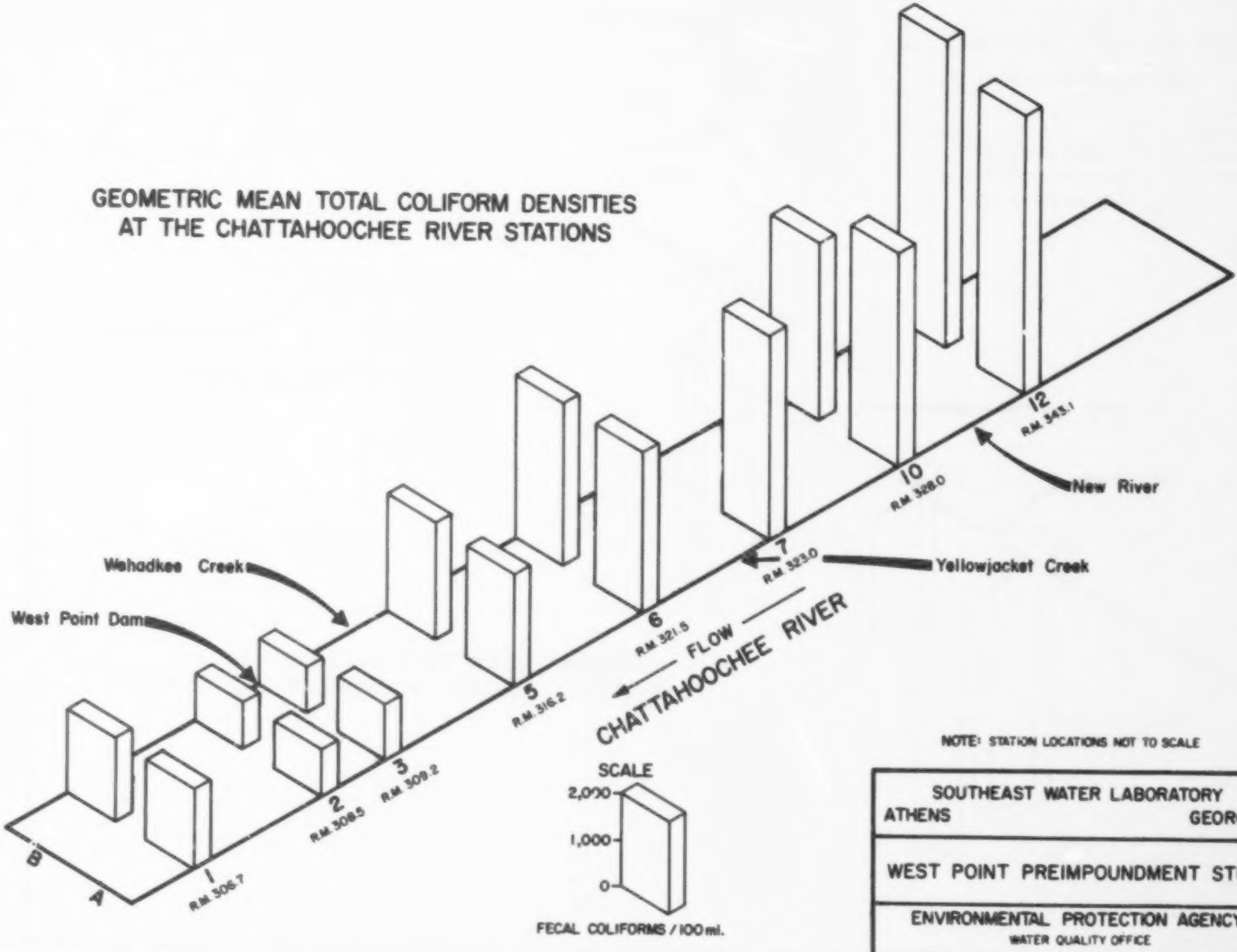
Station	Total Coliforms/100 ml[1]	Fecal Coliforms/100 ml[1]	Number of Determinations
1A*	17,000	820	16
1B*	18,000	1,000	17
2A	10,000	620	12
2B	10,000	820	12
3A	12,000	710	12
3B	9,800	560	11
4	2,000	200	17
5A	24,000	1,700	17
5B	25,000	1,600	16
6A	35,000	3,000	16
6B	35,000	2,400	16
7	44,000	2,900	16
8	17,000	1,800	16
9	4,200	600	16
10A	46,000	2,700	16
10B	38,000	3,100	16
11	3,800	540	16
12A	60,000	5,100	16
12B	66,000	5,100	16
13	1,500	220	16

1/ Geometric Mean

* A - right bank looking upstream; B - left bank looking upstream.

FIGURE 23

GEOMETRIC MEAN TOTAL COLIFORM DENSITIES AT THE CHATTAHOOCHEE RIVER STATIONS



NOTE: STATION LOCATIONS NOT TO SCALE

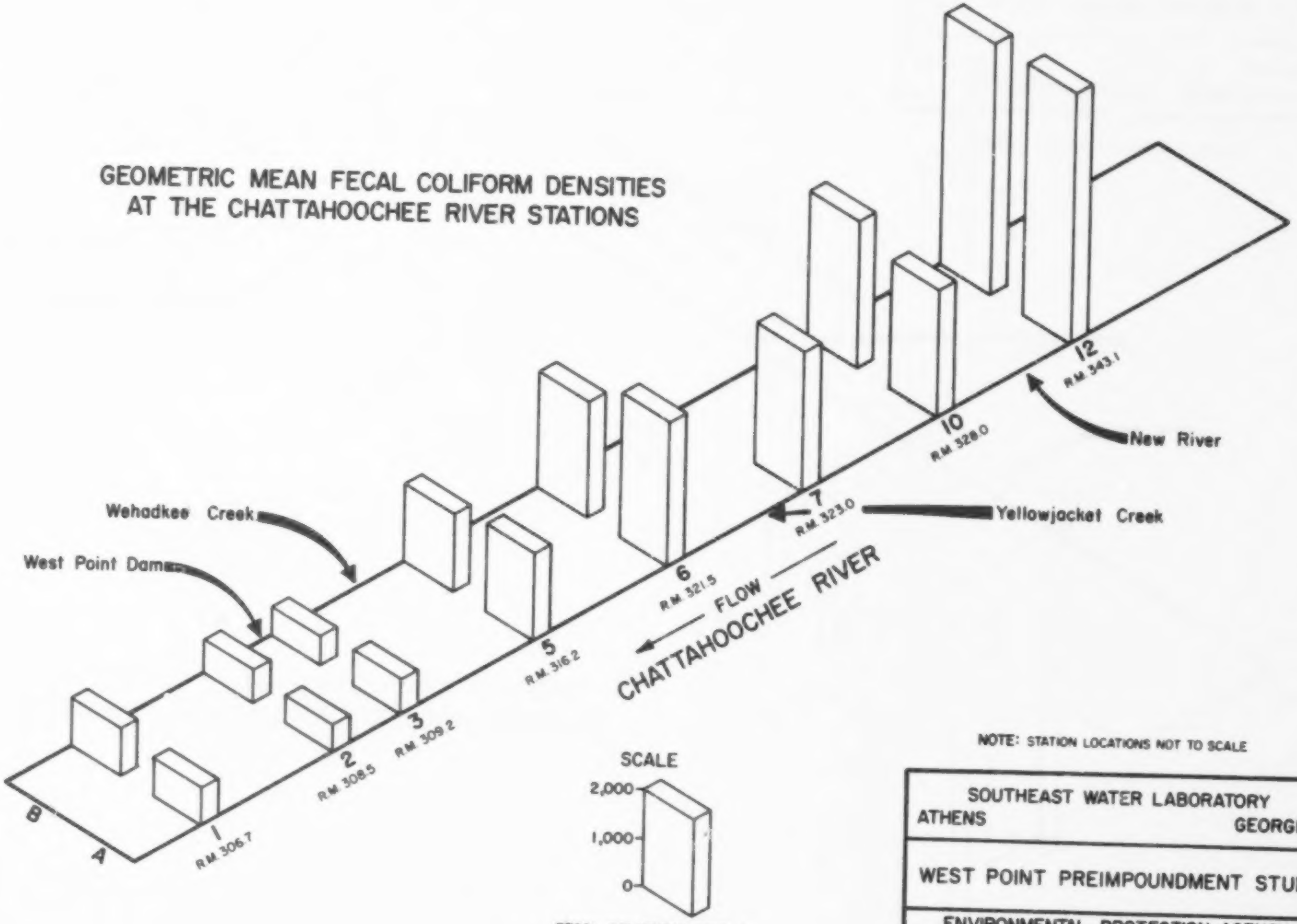
SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

WEST POINT PREIMPOUNDMENT STUDY

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 24

GEOMETRIC MEAN FECAL COLIFORM DENSITIES AT THE CHATTAHOOCHEE RIVER STATIONS



NOTE: STATION LOCATIONS NOT TO SCALE

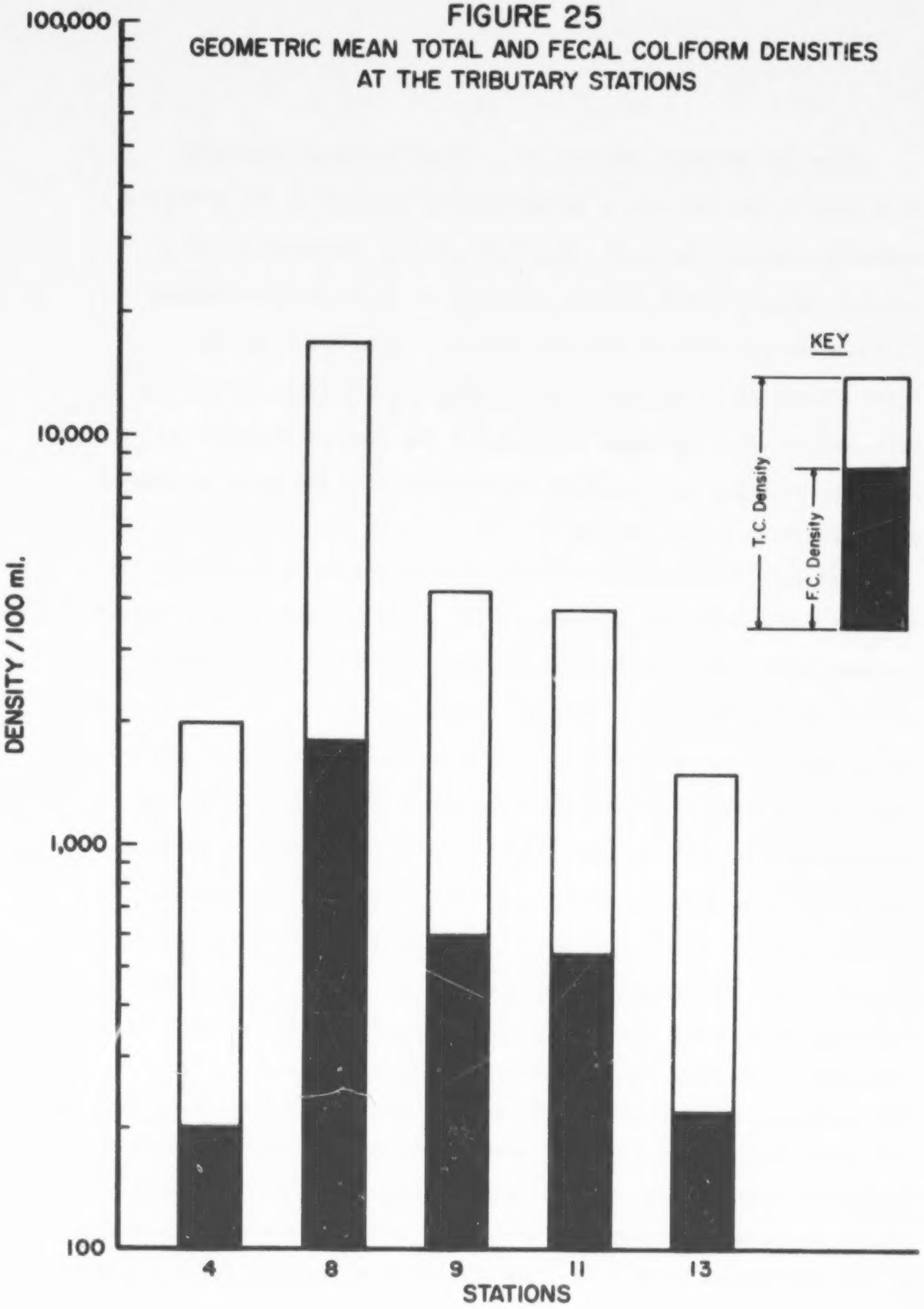
SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

WEST POINT PREIMPOUNDMENT STUDY

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 25

GEOMETRIC MEAN TOTAL AND FECAL COLIFORM DENSITIES AT THE TRIBUTARY STATIONS



Using the geometric mean total and fecal coliform densities at Station 12 to represent a theoretical 100 percent of the indicator organisms entering the study area, a 70 percent reduction in total coliform density and 80 percent reduction in fecal coliform density occurred between this station and Station 1 (mile 306.7) at West Point (Figure 26). The reduction in indicator densities should be much greater after impoundment because of the cumulative effect of dilution, settling and increased time of flow from the upper reaches of the impoundment to the dam site.

That portion of the river within the study area is classified by the State of Georgia for recreational use. The present bacteriological standard for recreational waters adopted by the State of Georgia is a monthly arithmetic mean of 1000 fecal coliforms per 100 ml. This standard is presently under review by the Environmental Protection Agency as being too permissive. The National Technical Advisory Committee has recommended a bacteriological criterion for primary contact recreational waters not to exceed a log mean of 200 fecal coliforms per 100 ml.

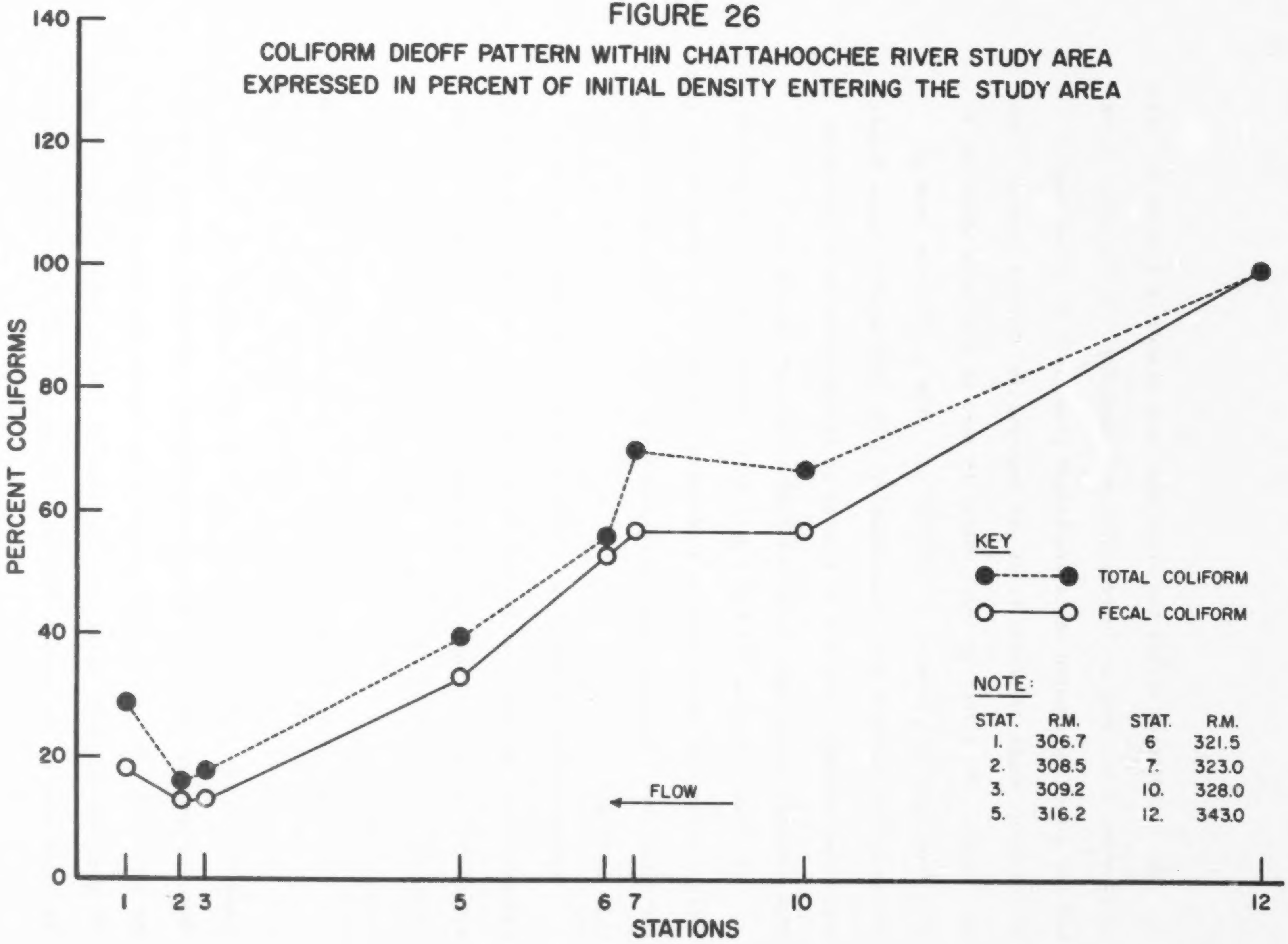
The mean fecal coliform densities at every river station above Station 3(mile 309.[illegible] were in violation of the present recommended recreational standard 100 fecal coliforms per 100 ml (Table IX). After impoundment, assuming the proposed treatment facilities in Atlanta are completed, the bacteriological quality of the water should be improved and no difficulty encountered in meeting the present recommended bacteriological standard or a more restrictive standard in the lower portions of the impoundment. However, there may be problems in the upper reaches of the impoundment in meeting a more restrictive bacteriological standard (e.g. 300/100 ml).

---

* The means expressed in the report are geometric means.

FIGURE 26

COLIFORM DIEOFF PATTERN WITHIN CHATTAHOOCHEE RIVER STUDY AREA EXPRESSED IN PERCENT OF INITIAL DENSITY ENTERING THE STUDY AREA



The tributaries within the study area were generally free of any major point sources of fecal pollution, with one exception. Yellowjacket Creek was influenced by treated waste discharged from the City of LaGrange's Yellowjacket Waste Treatment Plant and Hogansville, Georgia, Sewage Treatment Plant. The effect of these wastes is seen at Station 8 which had a mean fecal coliform density of 1800/100 ml. This station was located approximately one-half mile downstream from the Yellowjacket Waste Treatment Plant outfall. Station 9, located on Yellowjacket Creek, upstream from LaGrange, had a mean fecal coliform density of 600/100 ml.

New River (Station 11) had a mean fecal coliform density of 540/100 ml which indicated no major fecal contamination. A sanitary survey in the area indicated that livestock could account for some fecal contamination along this tributary.

Wehadkee Creek appeared to be free from any major sources of fecal contamination, as indicated by mean fecal coliform densities of 200/100 ml and 220/100 ml at Stations 4 and 13 respectively. Wildlife and livestock within the area possibly contributed small amounts of fecal waste to Wehadkee Creek.

The bacteriological data collected during the summer and winter studies were separated into rainfall periods (high flow conditions) and dry periods (stable flow conditions). The rainfall data used in reporting the data were obtained from the National Climatic Center, LaGrange, Georgia (Table V). The data were separated in this manner to delineate the effect of land run-off upon the bacterial quality of the streams. The rainfall period included the first week of the summer study and the second week of the winter study.

The remainder of the summer and winter studies constituted the dry period or stable flow period.

As seen in Table X there were no appreciable differences in mean total and fecal coliform densities between left and right bank stations at each point in the river. These densities were averaged to give one total and one fecal coliform mean at each point in the river and are graphically presented in Figures 27 and 28. The mean total and fecal coliform densities were higher during the rainfall period than during the dry period at nearly every station. This is expected because of the additional fecal contamination and nonfecal soil related coliforms introduced into the streams by land runoff.

Stations 2 and 3 were not sampled during the last week of the rainfall period because of exceptionally high waters. The failure to obtain these samples is reflected by lower total and fecal coliform densities at Stations 2 and 3 during the rainfall period (Figures 27 and 28). Had sampling been possible during the heavy runoff period, a pattern of elevated indicator levels similar to that presented at Stations 1 and 5 would have been produced.

Generally, the smaller the stream the more noticeable the effect is from land runoff. Examples of this pattern are seen at the tributary stations (Figures 29 and 30).

ISOLATION OF SALMONELLA

In addition to the indicator determinations, special qualitative examinations were made at selected stations for the genus Salmonella.

FIGURE 27

COMPARISON OF THE GEOMETRIC MEAN TOTAL COLIFORM DENSITIES
AT THE RIVER STATIONS IN WET AND DRY PERIODS

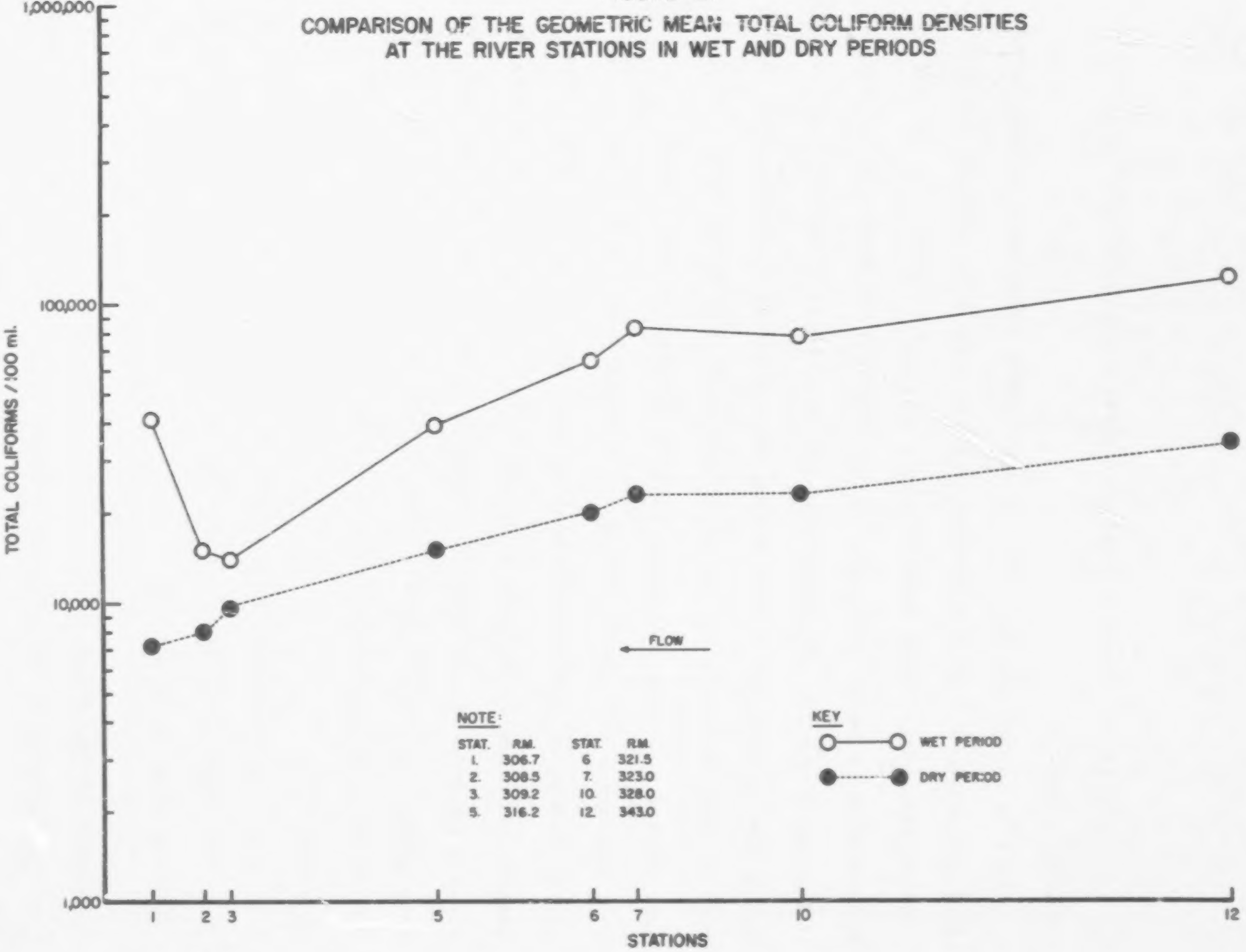


FIGURE 28

COMPARISON OF THE GEOMETRIC MEAN FECAL COLIFORM DENSITIES AT THE RIVER STATIONS IN WET AND DRY PERIODS

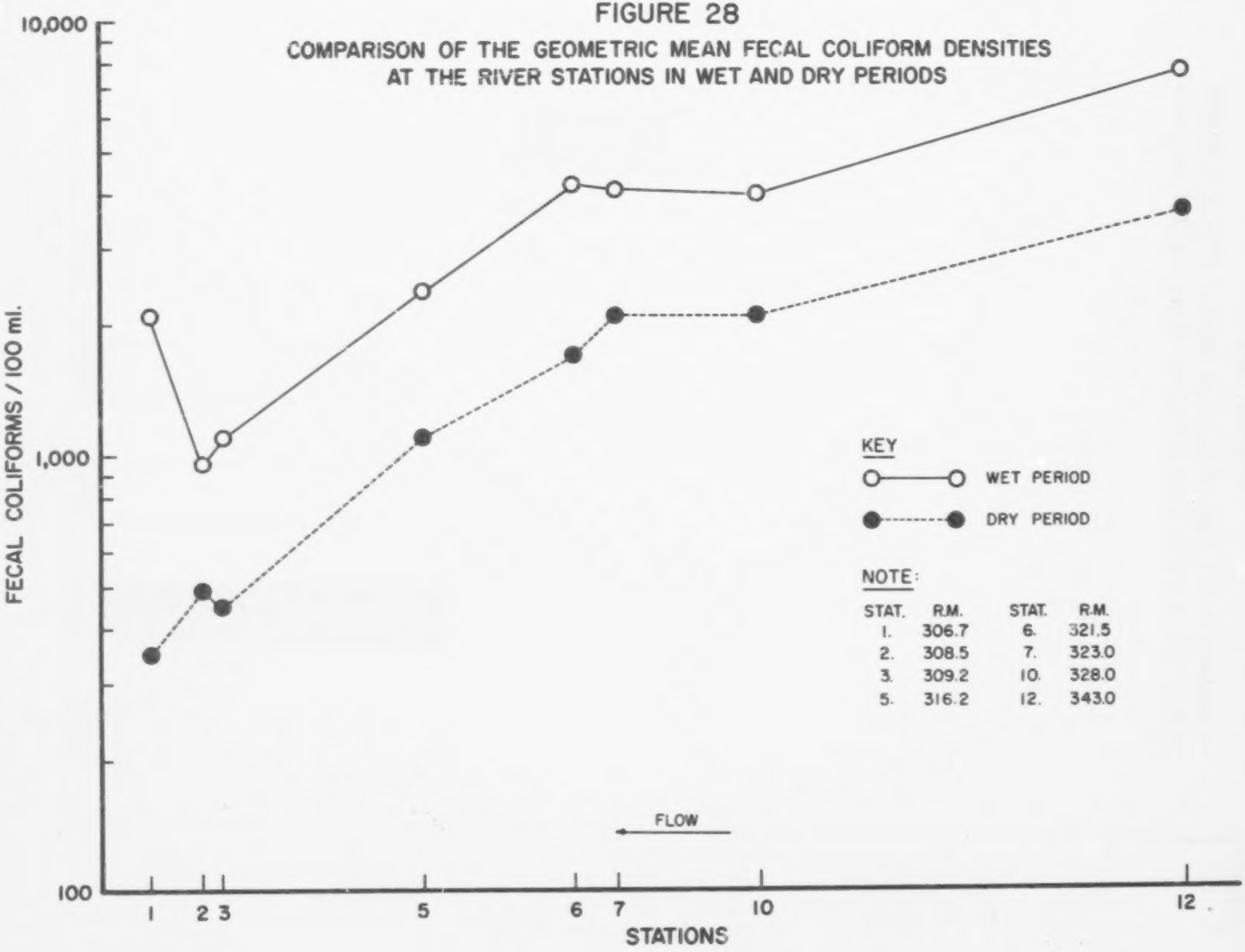


FIGURE 29

COMPARISON OF THE GEOMETRIC MEAN TOTAL COLIFORM DENSITIES AT TRIBUTARY STATIONS IN WET & DRY PERIODS

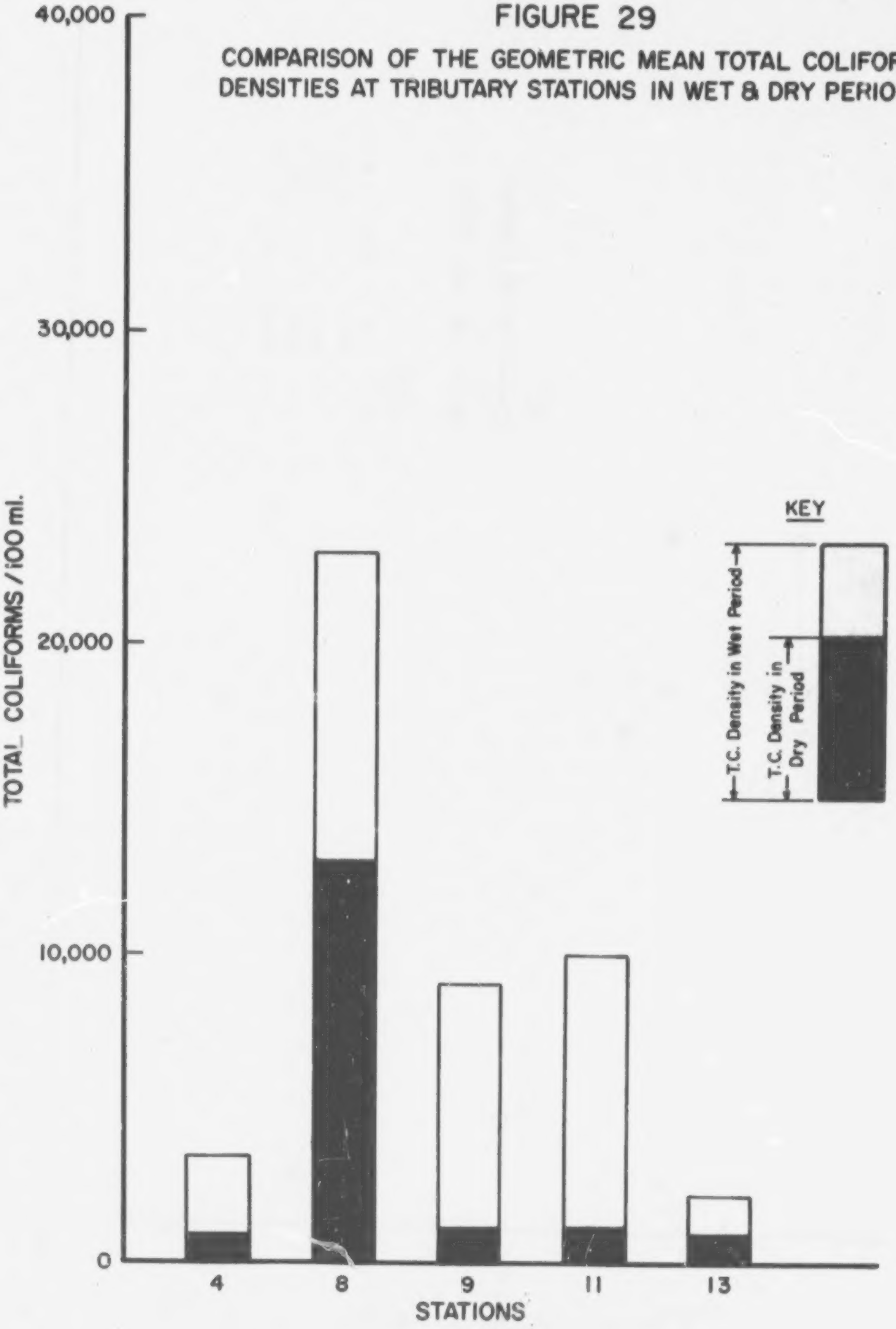


FIGURE 30

COMPARISON OF THE GEOMETRIC MEAN FECAL COLIFORM DENSITIES AT TRIBUTARY STATIONS IN WET & DRY PERIODS

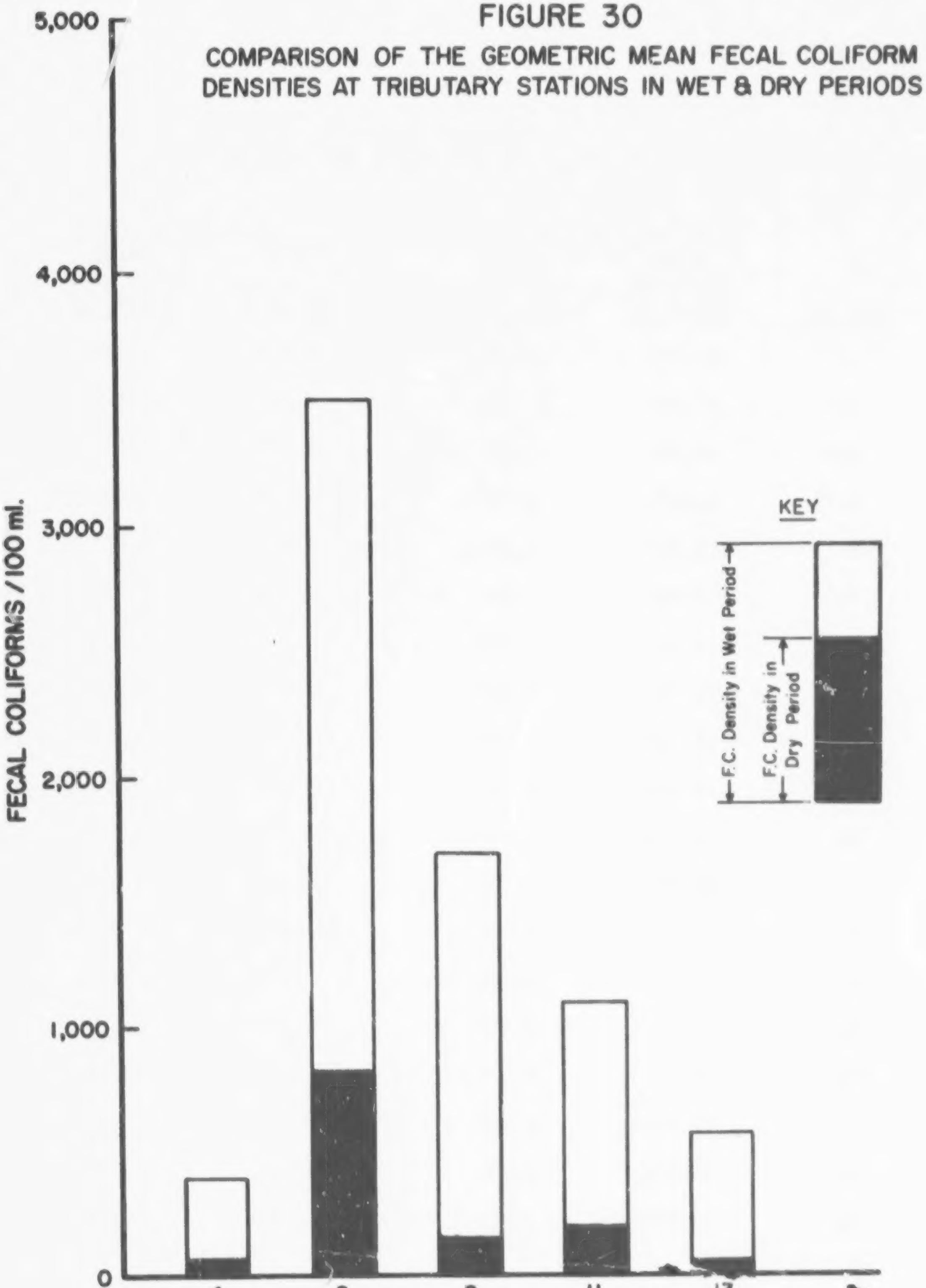


TABLE X

COLIFORM DENSITIES
RAINFALL PERIODS VERSUS DRY PERIODS

Station	Rainfall Period Total Coliforms 100 ml 1/	Rainfall Period Fecal Coliforms 100 ml 1/	Dry Period Total Coliforms 100 ml 1/	Dry Period Fecal Coliforms 100 ml 1/
1A*	44,000	2,000	6,600	300
1B*	38,000	2,100	7,700	400
2A **	13,000	820	8,500	510
2B **	16,000	1,100	7,600	470
3A **	18,000	1,200	9,400	500
3B **	9,400	920	10,000	390
4	3,500	400	900	71
5A	35,000	2,500	16,000	1,100
5B	43,000	2,200	14,000	1,100
6A	59,000	4,600	21,000	1,900
6B	69,000	3,800	18,000	1,400
7	82,000	4,100	23,000	2,100
8	23,000	3,500	13,000	820
9	9,100	1,700	1,600	150
10A	91,000	3,500	23,000	2,100
10B	63,000	4,500	23,000	2,100
11	10,000	1,200	1,100	190
12A	110,000	6,400	34,000	4,000
12B	130,000	7,200	33,000	3,400
13	2,200	570	3,400	63

1/ Geometric Mean

* A - right bank looking upstream; B - left bank looking upstream.

** Stations were not sampled during a one week rainfall period due to exceptionally high waters.

A total of 25 samples were analyzed for Salmonella during the summer and winter studies. During the summer study seven serotypes were isolated at seven stations, and during the winter study 16 serotypes were isolated at 12 stations.

Salmonella is a large serologically related genus comprised of some 1300 serotypes. Salmonella is probably the easiest enteric pathogen to isolate from environmental waters. All Salmonella are considered pathogenic for man, animals, or both. The presence of Salmonella is proof of fecal contamination and establishes the potential of disease contraction resulting from water ingestion or contact.

The relative density of an indicator is generally viewed to indicate the relative magnitude of wastes being discharged. Moreover, as the indicator level increases, so does the probability of pathogen presence increase. Tables XI and XII show the fecal coliform densities and Salmonella serotypes recovered during the summer and winter studies. As shown, Salmonella were isolated at stations when the mean fecal coliform densities were as low as 76, 79 and 86/100 ml and not isolated when the mean fecal coliform density was as high as 1800/100 ml. The failure to isolate Salmonella at this high FC level does not infer the insignificance of the fecal coliform group as indicators of fecal contamination. Rather, the failure to isolate Salmonella at higher fecal coliform levels possibly results from analytical inadequacies (swab technique), sporatic discharge of these pathogens, availability of host animals, or a combination of these factors. The recovery of Salmonella at fecal coliform densities of less than 100/100 ml simply underscores the fact that low indicator levels alone do not negate the possibility of pathogen presence.

TABLE XI

FECAL COLIFORM DENSITIES AND SALMONELLA SEROTYPES RECOVERED AT SELECTED STATIONS DURING SUMMER STUDY

Stream	Sta.	Mean FC/100 ml*	FC/100 ml**	Salmonella Serotypes Recovered
Chattahoochee R.	1	240	1,400	None isolated
" "	2	300	1,000	*S. typhimurium*
" "	5	1,200	3,000	*S. thompson*
" "	6	1,800	3,300	None isolated
" "	7	1,800	5,600	*S. rubislaw*
" "	10	1,600	4,900	*S. havana*
" "	12	3,300	23,000	*S. muenchen*
Wehadkee Creek	4	100	100	*S. montevideo*
Wehadkee Creek	13	110	100	None isolated
Yellowjacket Cr.	8	5,400	8,200	*S. derby*
Yellowjacket Cr.	9	520	8,900	None isolated
New River	11	510	3,600	None isolated

---

* Geometric mean fecal coliform density during period of swab suspension.

** Fecal coliform density on day of swab retrieval.

TABLE XII

FECAL COLIFORM DENSITIES AND *SALMONELLA* SEROTYPES RECOVERED AT SELECTED STATIONS DURING WINTER STUDY

Stream	Sta.	Mean FC/100 ml*	FC/100 ml**	Salmonella Serotypes Isolated
Chattahoochee R.	1A	640	1,500	*S. cubana*
" "	2B	560	600	*S. heidelberg*, *S. rubislaw*, *S. infantis*
" "	3A	630	1,100	*S. orion*, *S. infantis*
" "	5A	990	950	*S. cubana*, *S. san diego*, *S. heidelberg*
" "	6B	1,500	900	*S. newington*, *S. heidelberg*
" "	7	2,300	2,100	*S. heidelberg*, *S. infantis*, *S. thompson*
" "	10A	2,500	2,200	*S. anatum*, *S. amager*, *S. blockley*
" "	12A	4,700	6,000	*S. give*, *S. rubislaw*, *S. infantis*
Wehadkee Creek	4	86	610	*S. derby*
Wehadkee Creek	13	79	970	*S. give*, B, b
Yellowjacket Cr.	8	130	200	*S. typhimurium*, *S. rubislaw*
Yellowjacket Cr.	9	76	1,200	*S. newington*
New River 11	11	170	6,800	*S. give*

---

* Geometric mean fecal coliform density during period of swab suspension.
** FC density at station on day of swab retrieval (heavy rainfall previous night)

Salmonella were isolated at five of the seven river stations where recovery was attempted during the summer study and were isolated from every river station during the winter study. These numerous isolations indicate that the entire reach of the Chattahoochee River within the study area was potentially hazardous for water contact activities at the time of the study.

The isolation of *S. rubislan* during the summer study and *S. heidelberg*, *S. infantis* and *S. thompson* during the winter study at the LaGrange water intake (Station 7) emphasizes the need for adequate waste and water treatment to remove these pathogenic bacteria.

ENVIRONMENTAL CHANGES FOLLOWING IMPOUNDMENT

GENERAL

There are many well-defined water quality/enviornmental changes which result from impoundment. Classical limnology references provide much insight into results of impoundment. For the West Point project, it is appropriate that some of the changes following impoundment be discussed in this preimpoundment report -- many of these changes are beneficial but others may require that measures be taken to prevent or mitigate undesirable conditions.

PHYSICAL CHANGES

Impoundment of the Chattahoochee River by the West Point Dam will reduce water velocities and allow precipitation of suspended silt. A delta is expected to develop at the reservoir's headwaters near Franklin, Georgia. Downstream, the intermittently muddy waters of the Chattahoochee should become clear.

The water temperature regime will be modified in the reservoir. Spring temperature rises will be delayed and autumn temperatures prolonged by impoundment. Summertime thermal stratification and allied quality problems may be alleviated because the Corps of Engineers is considering methods of artificial destratification. Without such facilities, the formation of density currents and thermal stratification can be expected to change normal temperature patterns downstream. The amount of change would also depend on the withdrawal elevation for reservoir discharges.

CHEMICAL CHANGES

Predictions of future chemical changes usually includes considerable uncertainty. In the West Point Reservoir these predictions are more indefinite than usual because of pending projects that may enhance water quality. The projects include: improved treatment of wastes entering the river from the Atlanta area and an extensive artificial destratification system for the proposed reservoir.

Presently, the West Point Dam site is well downstream from the dissolved oxygen sag point caused by Atlanta's wastes. Occasionally, during the summer, the dissolved oxygen level near Franklin, Georgia, has fallen below 4 mg/l. However, the duration of low DO is so short that no adverse effects have been directly associated with this fluctuation. If thermal stratification is not extensive or prolonged, there should be no oxygen deficiency problems in the new lake.

Leaching of materials from the newly in undated bottom should be restricted largely to the early impoundment period. Although the huge volume of water stored in the reservoir after impoundment should provide sufficient dilution to prevent major problems, impoundment will cause a short term build-up of dissolved constituents.

By the time impoundment is began, most waste discharges in the watershed will be receiving secondary treatment. However, the residual nutrients in these wastes, together with raw waste discharges during rains from Atlanta's combined sewer system and surface runoff from both urban and rural areas may be of sufficient quantity to produce luxuriant algal growth. The possibility of this growth, which could interfere with recreation and could increase water treatment cost, cannot be ruled out on the basis of this study.

Another possible deleterious effect of impoundment is build-up of iron and manganese compounds in hypolimnetic waters. The soluble form of these metals in the +2 valence state produce problems in water supplies by causing obnoxious tastes, odors, and stains. Since direct lake water use includes potable and textile processing water supply, it is desirable that iron and manganese concentrations be kept low. If the Corps of Engineers installs a destratification facility in the reservoir, soluble iron in the zone of influence will be reduced but manganous forms may still be high unless the zone of destratification influence extends over most of the impounded area (19). Possible solutions to manganese problems for water supply purposes would be oxidation treatment of raw water and/or selective withdrawal of low manganese (usually epilimnetic) waters.

BIOLOGICAL CHANGES

Silt removal (decreased turbidity) and reduced water velocity are two major environmental changes caused by impoundment that drastically affect biotic conditions. (20)(21) While bacterial levels should be reduced to acceptable recreational levels, the increased sunlight penetration and the reduced velocity with adequate nutrients available will probably increase plant productivity. In open water, plankton productivity may greatly increase. Newly inundated reservoir arms and coves will likely develop lentic rooted plants. These rooted plants are basic food web elements and their biotic modifications are essential to developing a productive, well-balanced lake environment.

Bottom fauna changes will be marked by the disappearance of stream organisms and an increase in lake species. Certainly the streamdwelling stoneflies, caddisflies, and mayflies will not tolerate such reservoir conditions as reduced currents, deep water, or perhaps the absence of oxygen near the lake bottom. In the relatively stationary reservoir water, these flowing-water species will be replaced with other organisms. One mud-burrowing mayfly, Hexagenia, common to the Chattahoochee River should survive and perhaps thrive under the new conditions brought about by the impoundment. However, the principal benthic components will probably be various members of the Diptera and aquatic worm groups found in all southeastern United States lakes.

Greater fish production and better fishing are expected in the new lake because upstream pollution will be minimized by lake dilution and more fish habitat will be provided. However, a reservoir is not the solution to the Chattahoochee River pollution problem. Even with the impoundment, the headwaters of the reservoir, near Franklin, Georgia, may still be affected unfavorably by upstream pollution. The amount of river used by reservoir fish will depend on the effectiveness of pollution control program being implemented along the Chattahoochee River.

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APPENDIX A

Correspondence Requesting the Study

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT. CORPS OF ENGINEERS
P. O. BOX 889
SAVANNAH. GEORGIA 31402

IN REPLY REFER TO
SASNE

25 February 1970

Mr. John A. Little
Chief, Impoundment Studies
Department of Interior, FWPCA
Southeast Water Laboratory
College Station Road
Athens, Georgia 30601

Dear Mr. Little:

Inclosed are the original and three copies of DA Form 2544, Order for Reimbursable Services, covering preimpoundment water quality surveys at the West Point Project. Please sign and return two copies to the Savannah District.

Additional funds will be obligated in FY 1971 as outlined in our letter of 6 February 1970 to Mr. Thoman. A copy of your Regional Director's letter of 11 February 1970 is also inclosed.

Sincerely yours,

W T Moore
W. T. MOORE
Chief, Engineering Division

2 Incl
As stated

INTRA-ARMY ORDER FOR REIMBURSABLE SERVICES

For use of this form, see AR 37-108 and AR 37-110; the proponent agency is Office of the Comptroller of the Army.

1. RECEIVING OFFICE CONTROL NUMBER

☐ FUNDED ☐ AUTOMATIC

2. ORDER

a NUMBER: PD 70-6

b DATE: 17 Feb 70

3. CHANGE ORDER

a NUMBER:

b DATE:

4. ORDERED BY *(Command, Installation or Activity, and address) (Include ZIP Code)*

U.S. Army Engineer District, Savannah
Corps of Engineers, P.O. Box 889
Savannah, Georgia 31402

5. TO BE PERFORMED BY *(Command, Installation or Activity, and address) (Include ZIP Code)*

Dept. of Interior, FWPCA
Southeast Water Laboratory
College Station Road
Athens, Georgia 30601

6. DESCRIPTION OF SERVICES TO BE PERFORMED

It is requested that FWPCA make preimpoundment water quality surveys at the West Point Project. FY 1970 funds in the amount of $5,000 reserved for reconnaissance and preliminary surveys in accordance with reference SASNE letter dated 6 February 1970 and Department of Interior acceptance letter dated 11 February 1970. Additional funds to be reserved as required. Please identify all bills as follows:

PD 70-6-9260921-003046-05

7a NAME AND TITLE OF ORDERING OFFICER	b SIGNATURE	c DATE
FRANK H. POSEY, JR. Chief, Special Programs Section	Frank H. Posey Jr.	17 Feb 70

ORIGINATING FINANCE AND ACCOUNTING OFFICE APPROVAL

8a. ACCOUNTING CLASSIFICATION	b. AMOUNT
96X3122 Construction, General, CE, Civil	$5,000

c CHANGE

INCREASE AMOUNT ______ DECREASE AMOUNT ______ REVISED AMOUNT ______

9. Services to be performed pursuant to this order are properly chargeable to the appropriations or other accounts indicated above until ______ *(Day - Month - Year)* the expiration date of this order.

10a. TYPED NAME AND TITLE OF APPROVING OFFICER	b. SIGNATURE	c. DATE
JAMES A. MACDONALD, JR. Finance and Accounting Officer	James L. Lynn	20 Feb '70

ACCEPTING OFFICER

11. THE ABOVE TERMS AND CONDITIONS ARE SATISFACTORY AND ARE ACCEPTED.

a. TYPED NAME AND TITLE OF ACCEPTING OFFICER	b. SIGNATURE	c. DATE ACCEPTED
JOHN A. LITTLE Chief, Impoundment Studies	John A. Little	March 6, 1970

DA FORM OCT 64 2544 REPLACES PREVIOUS EDITION OF THIS FORM AND DA FORM 1619, 1 JAN 56, EXISTING SUPPLIES OF WHICH WILL BE ISSUED AND USED UNTIL 1 OCT 65 UNLESS SOONER EXHAUSTED.

U.S. GOVERNMENT PRINTING OFFICE : 1968 0—778-767

A-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

DIRECTOR
SOUTHEAST REGION
SUITE 300
1421 PEACHTREE STREET, N.E.
ATLANTA, GEORGIA 30309

Col. John S. Egbert, District Engineer
Savannah District, Corps of Engineers
P. O. Box 889
Savannah, Georgia 31402

Dear Col. Egbert:

Thank you for your letter of 6 February 1970, requesting a preimpoundment water quality survey at the West Point Project. We are in essential agreement with the features of the study outlined in your letter and in the Technical Studies Work Plan (revised as of September 1969). Preliminary aspects of the work will begin this fiscal year, and a request for reimbursement for $5,000 will be sent during 4th quarter FY 70. The study will be completed during FY 71 with quarterly billing for the remaining $20,000.

During reconnaissance of the study area, the need for additional sampling stations may be established. We feel that limited additional sampling can be incurred within the cost frame which you have outlined.

May I also express pleasure with the working relationships established between our respective staffs. Studies such as this one at West Point, and also at Allatoona Reservoir, will only improve our capability for providing water quality control.

Sincerely yours,

John R. Thoman
Director

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 889
SAVANNAH, GEORGIA 31402

IN REPLY REFER TO
SASNE

6 February 1970

Mr. John R. Thoman
Regional Director, Southeast Region
Federal Water Pollution Control
  Administration
Suite 300
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Reference is made to discussions with Mr. J. A. Little of your Southeast Water Laboratory and Mr. F. H. Posey of our Special Programs Section on 28 January 1970, in Athens, Georgia, concerning the Water Quality Pre-Impoundment Survey for the West Point Project.

It was agreed that FWPCA personnel from the impoundment studies group would perform the pre-impoundment survey outlined in the inclosed Technical Studies Work Plan, dated February 1969, as revised through September 1969. This work will be performed at the twelve sampling stations shown on page 4, analyzing the parameters listed on pages 5, 6, and 7, and using the methods and procedures agreed upon. It was further agreed that this work could be performed within the estimated cost summarized on page 8.

The Savannah District will reimburse the Southeast Water Laboratory for the cost incurred up to $25,000, which will include payment for all field sampling, bacteriological and chemical analyses, data processing, report preparation and reproduction, per diem and transportation, and contingencies.

It was further agreed that the Southeast Water Laboratory would bill Savannah District on a quarterly basis for services performed as follows:

a. Fiscal Year 1970: $5,000 for reconnaissance and preliminary survey, locate and establish sampling stations, and compile and research existing data.

b. Fiscal Year 1971: $20,000 for field investigations primarily in August 1970 and January 1971 (and at other periods if required to establish low flow, warm weather, and high flow, cold weather conditions), and for all other work necessary to complete the final report by 1 July 1971.

SASNE
Mr. John R. Thoman

6 February 1970

Upon receipt of notification from the Federal Water Pollution Control Administration of your acceptance of the above described work, the Department of the Army, Savannah District, Corps of Engineers, will obligate the necessary funds.

To assist in your planning of this pre-impoundment survey, the following West Point Project schedule is furnished:

Initiate Phase I - Reservoir Clearing	1 Jul 1971
Initiate Phase II - Reservoir Clearing	1 Dec 1971
River Closure	Jun 1972
Begin Filling	Nov 1972
Project Completion	Sep 1973

You will be notified immediately of any significant change in the above schedule; and, likewise, we would require that you notify us of any significant departure from this letter of agreement and the inclosed Technical Studies Work Plan.

It is indeed a pleasure to continue our cooperative endeavors in the interest of maintaining a high quality environment.

Sincerely yours,

JOHN S. EGBERT
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copy Furnished w/incl
Mr. John A Little
Chief, Impoundment Studies
FWPCA, Southeast Water Laboratory
College Station Road
Athens, Georgia 30601

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: February 3, 1970

FROM : John A. Little

SUBJECT: West Point Preimpoundment Study, Georgia & Alabama

Bob Schneider, Bobby Carroll, and I met in Athens on January 28 with Frank Posey and Herb Darigo of the Savannah District, Corps of Engineers, to discuss the subject study. The Corps had estimated that two 2-week long seasonal surveys would cost approximately $24,900, for which we would be reimbursed if we agree to perform the work. Our reaction to the Corps was favorable, and tentative dates for field studies were set for August, 1970, and during the winter of 1970-71.

Some concern was expressed that clearing operations at the reservoir would interfere with water quality investigations. A check with the district office revealed no problem:

July 1, 1971 –	Clearing near dam to begin
December 1, 1971 –	Clearing upper reservoir to begin
June 1, 1972 –	Dam closure
November 1, 1972 –	Start filling

After exchanging necessary correspondence to initiate studies, we agreed to bill up to $5,000 during FY-70 in order to "get the study on the books". For this initial sum and before this fiscal year ends, a reconnaissance will be made to determine final sampling points (among other things). Data available from past state and FWPCA studies in the area will also be collected and analyzed. Mr. Olinger began the assemblage and analysis of past data some time back.

We agreed to a quarterly billing procedure with a final report completion date set for spring, 1971.

John A. Little

John A. Little

cc: Paul J. Traina
Robert Schneider
Bobby J. Carroll

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

5010-108

A-8

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: July 11, 1969

FROM : J. A. Little

SUBJECT: West Point Reservoir pre-impoundment study

Mr. Herb Rogers called today to inform me that a request for the subject studies will not be made until next year (calendar year 1970). Clearing operations will not begin at the reservoir site until 1971, therefore, if we conduct our major effort next year there should be no major interference from construction activities.

cc: P. Traina

Alex

5010-108

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

UTHEAST WATER LABORATORY
ATHENS, GEORGIA 30601

May 20, 1969

Mr. Frank H. Posey, Jr.
Chief, Special Programs Section
U. S. Army Engineer District, COE
P. O. Box 889
Savannah, Georgia 31402

Dear Mr. Posey:

In our phone conversation last week you mentioned that there might be a delay in your request for preimpoundment studies on the West Point Reservoir project. I mentioned at the time, and I would like to go on record now by saying, such a delay would create problems with our studies. In the past we have found that construction activities interfere with water quality investigations, and we would like to complete these investigations before construction has advanced too far.

Sincerely yours,

Alex

John A. Little
Chief, Impoundment Studies

Incl 2

APPENDIX B

Location of Sampling Stations

TABLE 1

LOCATION OF SAMPLING STATIONS

Station No.	River Mile	Location
1	306.7	Chattahoochee River - West Point, Georgia, above U.S. 29. Troup County, Georgia.
2	308.5	Chattahoochee River - Approximately 0.5 mile downstream from the damsite. Troup County, Georgia.
3	309.2	Chattahoochee River - Approximately 1,000 ft. upstream from damsite. Troup County, Georgia.
4	314.4 7.3	Wehadkee Creek - Relocated State Route 244, just east of State Line Road. Troup County, Georgia.
5	316.2	Chattahoochee River - Georgia Hwy. 238, west of LaGrange, Georgia. Troup County, Georgia.
6	321.5	Chattahoochee River - Georgia Hwy. 109, west of LaGrange, Georgia. Troup County, Georgia.
7	323.0	Chattahoochee River - LaGrange water supply intake station. Troup County, Georgia.
8	321.9 1.3	Yellowjacket Creek - Cameron Mill Road on County Road S 2098, west of LaGrange, Georgia. Troup County, Georgia.
9	321.9 13.2	Yellowjacket Creek - Youngs Mill Road, northeast of LaGrange, Georgia. Troup County, Georgia.
10	328.0	Chattahoochee River - Georgia Hwy. 219, northwest of LaGrange, Georgia. Troup County, Georgia.
11	335.2 3.3	New River - U.S. Hwy. 27, south of Franklin, Georgia. Heard County, Georgia.
12	343.1	Chattahoochee River - U.S. Hwy. 27, Franklin, Georgia. Heard County, Georgia.
13	314.4 0.8	Wehadkee Creek - Georgia Hwy. 60, west of LaGrange, Georgia. Troup County, Georgia.

APPENDIX C

USPHS Water Quality Data
for the
Chattahoochee River Basin
1964, 1965, and 1966

```
WEST POINT STUDY                                           121910        CH-01
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                       CHATTAHOOCHEE R WESTPT ABOV US29
                                                           13 GEORGIA
                                                           SOUTHEAST
                                                           CHATTAHOOCHEE
                                                           11135050             2111204

************************************************************************************************************************
 DATE  PARAMETER         00002     00007     00010     00020     00060     00070     00095     00300     00301     00304
 FROM                 HSAMPLOC  DISTANCE     WATER       AIR    STREAM      TURB  CNDUCTVY        DO        DO       BOD
  TO                    % FROM      FR Y      TEMP      TEMP      FLOW      JKSN    AT 25C               SATUR     2 DAY
                       RT BANK     MILES      CENT      CENT  CUFT/SEC        JU  MICROMHO      MG/L   PERCENT      MG/L

64/10/19
        NUMBER                         2        52        18        39                  14        37        36
        MAXIMUM                       5.      30.0      24.0     7900.                 74.       9.8     100.0
        MINIMUM                       3.       2.4      12.0     1970.                 42.       3.7      46.0
        MEAN                          4.      17.1      17.0     3806.                 54.       8.1      88.0
        LOG MEAN                      4.      14.6      16.5     3591.                 53.       8.0      87.3
66/ 2/ 6
************************************************************************************************************************
 DATE  PARAMETER         00305     00310     00400     00403     00410     00500     00515     00530     00610     00625
 FROM                      BOD       BOD        PH       LAB     T ALK   RESIDUE   RESIDUE   RESIDUE   AMMONIA  TOT KJEL
  TO                     3 DAY     5 DAY                  PH     CACO3     TOTAL  DISS-105  TOT NFLT     NH3-N         N
                          MG/L      MG/L        SU        SU      MG/L      MG/L  C   MG/L      MG/L      MG/L      MG/L

64/10/19
        NUMBER                        24        38                  31
        MAXIMUM                      5.8      7.30                 20.
        MINIMUM                      0.5      6.60                 14.
        MEAN                         1.7      6.92                 16.
        LOG MEAN                     1.4      6.91                 16.
66/ 2/ 6
************************************************************************************************************************
 DATE  PARAMETER         00630     00650     00653     00680     00940     01000     01005     01010     01020     01025
 FROM                  NO2&NO3     T PO4  SOLPO4-T   T ORG C  CHLORIDE   ARSENIC    BARIUM  BERYLIUM     BORON   CADMIUM
  TO                         N       PO4       PO4         C        CL   AS.DISS   BA.DISS   BE.DISS    B.DISS   CD.DISS
                          MG/L      MG/L      MG/L      MG/L      MG/L      UG/L      UG/L      UG/L      UG/L      UG/L

64/10/19
        NUMBER                                                      19         2         2         2         2         2
        MAXIMUM                                                     6.       30.       16.      0.02       21.        5.
        MINIMUM                                                     3.       30.       14.      0.02       19.        5.
        MEAN                                                        4.       30.       15.      0.02       20.        5.
        LOG MEAN                                                    4.       30.       15.      0.02       20.        5.
66/ 2/ 6
************************************************************************************************************************
 DATE  PARAMETER         01030     01035     01040     01045     01046     01049     01055     01056     01060     01065
 FROM                 CHROMIUM    COBALT    COPPER      IRON      IRON      LEAD  MANGNESE  MANGNESE      MOLY    NICKEL
  TO                   CR.DISS   CO.DISS   CU-DISS     TOTAL   FE.DISS   PB.DISS        MN   MN.DISS   MO.DISS   NI.DISS
                          UG/L      UG/L      UG/L      UG/L      UG/L      UG/L      UG/L      UG/L      UG/L      UG/L

64/10/19
        NUMBER                 2         2         2         5         3         2         4         2         2         2
        MAXIMUM              29.        2.      255.     1175.        1.       13.     153.0       0.1       13.       17.
        MINIMUM               3.        1.        2.        1.        0.        3.       0.4       0.0        5.        2.
        MEAN                 16.        2.      129.      274.        0.        8.      39.6       0.1        9.       10.
        LOG MEAN              9.        1.       23.       14.        0.        6.       4.2       0.1        8.        6.
66/ 2/ 6
************************************************************************************************************************
 DATE  PARAMETER         01070     01075     01080     01085     01090     01105     31501     31505     31615     31616
 FROM                   PHOS-T    SILVER  STRONTUM  VANADIUM      ZINC  ALUMINUM  TOT COLI  TOT COLI  FEC COLI  FEC COLI
  TO                    P-SPEC   AG.DISS   SR.DISS    V.DISS   ZN.DISS    AL.TOT  MFIMENDO  MPN CONF  MPNECMED  MFM-FCBR
                          UG/L      UG/L      UG/L      UG/L      UG/L      UG/L    /100ML    /100ML    /100ML    /100ML

64/10/19
        NUMBER                 1         2         2         2         2         2                  49        24
        MAXIMUM              65.       0.2       14.        2.       90.      141.           11000000.     8000.
        MINIMUM              65.       0.2       13.        2.        5.       11.               3100.      200.
        MEAN                 65.       0.2       14.        2.       48.       76.             281696.     1768.
        LOG MEAN             65.       0.2       13.        2.       21.       39.              30256.      969.
66/ 2/ 6
************************************************************************************************************************
```

```
          WEST POINT STUDY                                                    121920         CH-05
          SOUTHEAST REGION
          CHATTAHOOCHEE, RIVER                                                CHATTAHOOCHEE R GA 238 W OF LAGR
                                                                              13 GEORGIA
                                                                              SOUTHEAST
                                                                              CHATTAHOOCHEE
                                                                              11135050            2111204

*****************************************************************************************************************
 DATE   PARAMETER      00002     00007      00010      00020      00060      00070     00095     00300     00361     00304
 FROM                HSAMPLOC  DISTANCE    WATER       AIR       STREAM      TURB     CNDUCTVY    DO        DO        BOD
  TO                  % FROM    FR Y        TEMP       TEMP       FLOW       JKSN     AT 25C               SATUR     2 DAY
                     RT BANK    MILES       CENT       CENT     CUFT/SEC      JU     MICROMHO    MG/L     PERCENT     MG/L
64/10/19
        NUMBER                      2         47         19                              14        44        44
        MAXIMUM                    3.       31.0       26.0                             72.      11.7     113.0
        MINIMUM                    3.        2.5        7.0                             37.       5.8      73.0
        MEAN                       3.       17.3       15.7                             53.       8.6      88.0
        LOG MEAN                   3.       14.3       14.7                             52.       8.5      87.6
66/ 2/ 6
*****************************************************************************************************************
 DATE   PARAMETER      00305     00310      00400      00403      00410      00500     00515     00530     00610     00625
 FROM                  BOD       BOD        PH         LAB       T ALK     RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL
  TO                  3 DAY     5 DAY                  PH        CACO3      TOTAL    DISS-105  TOT NFLT   NH3-N       N
                      MG/L      MG/L        SU         SU         MG/L       MG/L    C   MG/L    MG/L      MG/L      MG/L
64/10/19
        NUMBER                     25         38                    31
        MAXIMUM                   3.3       7.30                   19.
        MINIMUM                   0.5       6.50                   13.
        MEAN                      1.6       6.85                   16.
        LOG MEAN                  1.4       6.85                   16.
66/ 2/ 6
*****************************************************************************************************************
 DATE   PARAMETER      00630     00650      00653      00680      00940      01000     01005     01010     01020     01025
 FROM                NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE   ARSENIC    BARIUM   BERYLIUM    BORON    CADMIUM
  TO                    N        PO4        PO4         C          CL      AS.DISS   BA.DISS   BE.DISS    B.DISS    CD.DISS
                      MG/L      MG/L       MG/L       MG/L       MG/L       UG/L      UG/L      UG/L      UG/L      UG/L
64/10/19
        NUMBER                                                      19          2         2         2         2         2
        MAXIMUM                                                     6.        30.       15.      0.02       15.        5.
        MINIMUM                                                     2.        30.       14.      0.02       15.        5.
        MEAN                                                        4.        30.       15.      0.02       15.        5.
        LOG MEAN                                                    3.        30.       14.      0.02       15.        5.
66/ 2/ 6
*****************************************************************************************************************
 DATE   PARAMETER      01030     01035      01040      01045      01046      01049     01055     01056     01060     01065
 FROM                CHROMIUM   COBALT     COPPER      IRON       IRON       LEAD    MANGNESE  MANGNESE    MOLY     NICKEL
  TO                 CR.DISS   CO.DISS    CU-DISS     TOTAL     FE.DISS    PB.DISS      MN     MN.DISS   MO.DISS   NI.DISS
                      UG/L      UG/L       UG/L       UG/L       UG/L       UG/L      UG/L      UG/L      UG/L      UG/L
64/10/19
        NUMBER              2         2          2          5          3          2         4         2         2         2
        MAXIMUM           37.        2.        43.       765.         0.        20.     105.0       0.1        3.       20.
        MINIMUM            1.        1.         2.         1.         0.         3.       0.2       0.0        2.        2.
        MEAN              19.        2.        23.       170.         0.        12.      26.7       0.1        3.       11.
        LOG MEAN           6.        1.         9.        11.         0.         8.       1.8       0.0        2.        6.
66/ 2/ 6
*****************************************************************************************************************
 DATE   PARAMETER      01070     01075      01080      01085      01090      01105     31501     31505     31615     31616
 FROM                PHOS-T     SILVER    STRONTUM   VANADIUM     ZINC    ALUMINUM   TOT COLI  TOT COLI  FEC COLI  FEC COLI
  TO                 P-SPEC    AG.DISS    SR.DISS     V.DISS    ZN.DISS     AL.TOT   MFIMENDO  MPN CONF  MPNECMED  MFM-FCBR
                      UG/L      UG/L       UG/L       UG/L       UG/L       UG/L     /100ML    /100ML    /100ML    /100ML
64/10/19
        NUMBER              1         2          2          2          2          2         5        39        24         6
        MAXIMUM           33.       0.2        15.         2.        77.       144.    82000.   240000.     8000.     2800.
        MINIMUM           33.       0.2        14.         2.        16.        17.    56000.     3300.      490.     1100.
        MEAN              33.       0.2        15.         2.        47.        81.    69000.    60136.     2637.     1832.
        LOG MEAN          33.       0.2        14.         2.        35.        49.    68132.    29578.     1809.     1713.
66/ 2/ 6
*****************************************************************************************************************
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WEST POINT STUDY                                                   121938         CH-06
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                               CHATT R GA HWY 109 W OF LAGRANGE
                                                                   13 GEORGIA
                                                                   SOUTHEAST
                                                                   CHATTAHOOCHEE                GDPH 16
                                                                   1113S050             2111204

****************************************************************************************************************
 DATE   PARAMETER     00002      00007      00010      00020      00060      00070      00095      00300      00301      00304
 FROM              HSAMPLOC   DISTANCE      WATER        AIR     STREAM       TURB   CNDUCTVY         DO         DO        ROD
  TO                 % FROM      FR Y        TEMP       TEMP       FLOW       JKSN     AT 25C                  SATUR      2 DAY
                    RT BANK      MILES       CENT       CENT   CUFT/SEC         JU   MICROMHO       MG/L    PERCENT       MG/L

65/ 8/12
        NUMBER                                 17                                                     17         17
        MAXIMUM                              31.0                                                    9.1      117.0
        MINIMUM                               2.3                                                    5.5       70.0
        MEAN                                 24.3                                                    6.8       84.2
        LOG MEAN                             20.3                                                    6.8       83.5
65/ 9/ 3
****************************************************************************************************************
 DATF   PARAMETER     00305      00310      00400      00403      00410      00500      00515      00530      00610      00625
 FROM                   ROD        ROD         PH        LAB      T ALK    RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL
  TO                  3 DAY      5 DAY                    PH      CACO3      TOTAL   DISS-105   TOT NFLT      NH3-N          N
                       MG/L       MG/L         SU         SU       MG/L       MG/L   C   MG/L       MG/L       MG/L       MG/L

65/ 8/12
        NUMBER                       17         17                   17
        MAXIMUM                     3.3       7.20                  28.
        MINIMUM                     0.5       6.50                  13.
        MEAN                        1.5       6.75                  16.
        LOG MEAN                    1.4       6.74                  16.
65/ 9/ 3
****************************************************************************************************************
 DATE   PARAMETER     00630      00650      00653      00680      00940      01000      01005      01010      01020      01025
 FROM              NO2&NO3      T PO4   SOLPO4-T    T ORG C   CHLORIDE    ARSENIC     BARIUM   BERYLIUM      BORON    CADMIUM
  TO                      N        PO4        PO4          C         CL    AS.DISS    BA.DISS    BE.DISS     B.DISS    CD.DISS
                       MG/L       MG/L       MG/L       MG/L       MG/L       UG/L       UG/L       UG/L       UG/L       UG/L

65/ 8/12
        NUMBER                                                       17
        MAXIMUM                                                      5.
        MINIMUM                                                      2.
        MEAN                                                         4.
        LOG MEAN                                                     4.
65/ 9/ 3
****************************************************************************************************************
 DATE   PARAMETER     01070      01075      01080      01085      01090      01105      31501      31505      31615      31616
 FROM               PHOS-T     SILVER   STRONTUM   VANADIUM       ZINC   ALUMINUM   TOT COLI   TOT COLI   FEC COLI   FEC COLI
  TO                P-SPEC    AG.DISS    SR.DISS     V.DISS    ZN.DISS     AL.TOT   MFIMENDO   MPN CONF   MPNECMED   MFM-FCBR
                      UG/L       UG/L       UG/L       UG/L       UG/L       UG/L     /100ML     /100ML     /100ML     /100ML

65/ 8/12
        NUMBER                                                                                     17         17
        MAXIMUM                                                                                24000.      4900.
        MINIMUM                                                                                 3100.       200.
        MEAN                                                                                    8635.      1247.
        LOG MEAN                                                                                7374.       706.
65/ 9/ 3
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WEST POINT STUDY                                                  121940      CH-08
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                              YELLOW JACKET CR S2098 W OF LAGR
                                                                  13 GEORGIA
                                                                  SOUTHEAST
                                                                  CHATTAHOOCHEE
                                                                  1113S050          2111204

***************************************************************************************************************************************
 DATE  PARAMETER       00002      00007      00010      00020      00060      00070      00095      00300      00301      00304
 FROM                 HSAMPLOC   DISTANCE    WATER       AIR       STREAM      TURB     CNDUCTVY      DO         DO        BOD
  TO                  % FROM     FR Y         TEMP       TEMP       FLOW       JKSN      AT 25C                 SATUR      2 DAY
                      RT BANK     MILES       CENT       CENT     CUFT/SEC      JU      MICROMHO     MG/L     PERCENT      MG/L
64/ 8/23
        NUMBER                                  29         13         30                    12         30         29
        MAXIMUM                               30.0       24.0       293.                   73.       10.0       97.0
        MINIMUM                               12.0        8.0        41.                   30.        5.5       65.0
        MEAN                                  20.0       17.0       127.                   59.        8.0       85.0
        LOG MEAN                              19.3       16.1       102.                   57.        7.8       84.4
65/ 9/ 3
***************************************************************************************************************************************
 DATE  PARAMETER       00305      00310      00400      00403      00410      00500      00515      00530      00610      00625
 FROM                   BOD        BOD        PH         LAB       T ALK     RESIDUE    RESIDUE    RESIDUE    AMMONIA    TOT KJEL
  TO                   3 DAY      5 DAY                  PH        CACO3      TOTAL     DISS-105   TOT NFLT    NH3-N        N
                        MG/L       MG/L       SU         SU        MG/L       MG/L      C   MG/L     MG/L       MG/L       MG/L
64/ 8/23
        NUMBER                       23         29                    30
        MAXIMUM                    13.2       7.20                   32.
        MINIMUM                     0.5       6.60                   22.
        MEAN                        2.0       6.90                   26.
        LOG MEAN                    1.4       6.89                   26.
65/ 9/ 3
***************************************************************************************************************************************
 DATE  PARAMETER       00630      00650      00653      00680      00940      01000      01005      01010      01020      01025
 FROM                 NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE    ARSENIC     BARIUM    BERYLIUM     BORON     CADMIUM
  TO                     N         PO4        PO4         C         CL       AS,DISS    BA,DISS    BE,DISS     B,DISS     CD,DISS
                        MG/L       MG/L       MG/L       MG/L       MG/L       UG/L       UG/L       UG/L       UG/L       UG/L
64/ 8/23
        NUMBER                                                        20
        MAXIMUM                                                       5.
        MINIMUM                                                       1.
        MEAN                                                          3.
        LOG MEAN                                                      3.
65/ 9/ 3
***************************************************************************************************************************************
 DATE  PARAMETER       01070      01075      01080      01085      01090      01105      31501      31505      31615      31616
 FROM                 PHOS-T     SILVER    STRONTUM   VANADIUM     ZINC     ALUMINUM   TOT COLI   TOT COLI   FEC COLI   FEC COLI
  TO                  P-SPEC     AG,DISS    SR,DISS    V,DISS     ZN,DISS    AL,TOT    MFIMENDO   MPN CONF   MPNECMED   MFM-FCBR
                        UG/L       UG/L       UG/L       UG/L       UG/L       UG/L     /100ML     /100ML     /100ML     /100ML
64/ 8/23
        NUMBER                                                                                       29         18
        MAXIMUM                                                                                 490000.    130000.
        MINIMUM                                                                                  23000.      4600.
        MEAN                                                                                    143483.     32411.
        LOG MEAN                                                                                 94833.     22338.
65/ 9/ 3
***************************************************************************************************************************************
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WEST POINT STUDY                                                121945        CH-09
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                          YELLOW JACKET CR NE LAGRANGE
                                                              13 GEORGIA
                                                              SOUTHEAST
                                                              CHATTAHOOCHEE
                                                              11135050          2111204

**************************************************************************************************************************
 DATE  PARAMETER     00002    00007     00010      00020     00060     00070     00095     00300     00301     00304
 FROM               HSAMPLOC DISTANCE   WATER       AIR     STREAM      TURB    CNDUCTVY    DO        DO        BOD
  TO                 % FROM   FR Y      TEMP       TEMP      FLOW       JKSN     AT 25C              SATUR     2 DAY
                     RT BANK  MILES     CENT       CENT    CUFT/SEC     JU      MICROMHO   MG/L     PERCENT    MG/L
65/ 8/12
       NUMBER                             17                                                 17        17
       MAXIMUM                          32.0                                                6.4      84.0
       MINIMUM                           2.6                                                5.3      60.0
       MEAN                             21.8                                                5.9      70.1
       LOG MEAN                         18.6                                                5.9      69.7
65/ 9/ 3
**************************************************************************************************************************
 DATE  PARAMETER     00305    00310     00400      00403     00410     00500     00515     00530     00610     00625
 FROM                 BOD      BOD        PH        LAB      T ALK    RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL
  TO                 3 DAY    5 DAY                  PH      CACO3     TOTAL    DISS-105  TOT NFLT   NH3-N        N
                     MG/L     MG/L        SU         SU      MG/L      MG/L     C   MG/L   MG/L      MG/L       MG/L
65/ 8/12
       NUMBER                  17         17                   16
       MAXIMUM                3.2       6.90                   32.
       MINIMUM                0.7       6.50                   23.
       MEAN                   1.5       6.72                   27.
       LOG MEAN               1.3       6.72                   26.
65/ 9/ 3
**************************************************************************************************************************
 DATE  PARAMETER     00630    00650     00653      00680     00940     01000     01005     01010     01020     01025
 FROM               NO2&NO3   T PO4    SOLPO4-T   T ORG C  CHLORIDE   ARSENIC   BARIUM   BERYLLIUM  BORON    CADMIUM
  TO                   N       PO4       PO4         C         CL     AS.DISS   BA.DISS   BE.DISS   B.DISS    CD.DISS
                     MG/L     MG/L      MG/L       MG/L      MG/L      UG/L      UG/L      UG/L      UG/L      UG/L
65/ 8/12
       NUMBER                                                  17
       MAXIMUM                                                 3.
       MINIMUM                                                 2.
       MEAN                                                    2.
       LOG MEAN                                                2.
65/ 9/ 3
**************************************************************************************************************************
 DATE  PARAMETER     01070    01075     01080      01085     01090     01105     31501     31505     31615     31616
 FROM               PHOS-T    SILVER   STRONTUM   VANADIUM    ZINC    ALUMINUM  TOT COLI  TOT COLI  FEC COLI  FEC COLI
  TO                P-SPEC   AG.DISS   SR.DISS     V.DISS    ZN.DISS   AL.TOT   MFIMENDO  MPN CONF  MPNECMED  MFM-FCBR
                     UG/L     UG/L      UG/L        UG/L      UG/L      UG/L     /100ML    /100ML    /100ML    /100ML
65/ 8/12
       NUMBER                                                                                 17        17
       MAXIMUM                                                                            240000.    79000.
       MINIMUM                                                                             24000.     1700.
       MEAN                                                                               106706.    19529.
       LOG MEAN                                                                            85719.    12766.
65/ 9/ 3
**************************************************************************************************************************
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WEST POINT STUDY                                              121960       CH-10
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                         CHATT R GA HWY 219 N W LAGRANGE
                                                             13 GEORGIA
                                                             SOUTHEAST
                                                             CHATTAHOOCHEE
                                                             11135050           2111204

**********************************************************************************************************************
                      00002     00007     00010     00020     00060     00070     00095     00300     00301     00304
 DATE  PARAMETER   HSAMPLOC  DISTANCE     WATER       AIR    STREAM      TURB  CNDUCTVY        DO        DO       BOD
 FROM                % FROM     FR Y       TEMP      TEMP      FLOW      JKSN    AT 25C                 SATUR     2 DAY
  TO                RT BANK     MILES      CENT      CENT  CUFT/SEC        JU  MICROMHO      MG/L   PERCENT      MG/L
65/ 8/12
       NUMBER                                17                                                17        17
       MAXIMUM                             32.0                                               9.5     122.0
       MINIMUM                              2.9                                               4.7      60.0
       MEAN                                25.2                                               6.6      81.4
       LOG MEAN                            23.3                                               6.5      80.2
65/ 9/ 3
**********************************************************************************************************************
                      00305     00310     00400     00403     00410     00500     00515     00530     00610     00625
 DATE  PARAMETER        BOD       BOD        PH       LAB     T ALK   RESIDUE   RESIDUE   RESIDUE   AMMONIA  TOT KJEL
 FROM                 3 DAY     5 DAY                  PH     CACO3     TOTAL  DISS-105  TOT NFLT     NH3-N         N
  TO                   MG/L      MG/L        SU        SU      MG/L      MG/L  C   MG/L      MG/L      MG/L      MG/L
65/ 8/12
       NUMBER                        17        17                  17
       MAXIMUM                      3.4      8.10                 26.
       MINIMUM                      0.7      6.50                 13.
       MEAN                         1.6      6.77                 17.
       LOG MEAN                     1.4      6.76                 17.
65/ 9/ 3
**********************************************************************************************************************
                      00630     00650     00653     00680     00940     01000     01005     01010     01020     01025
 DATE  PARAMETER   NO2&NO3      T PO4  SOLPO4-T   T ORG C  CHLORIDE   ARSENIC    BARIUM  BERYLLIUM    BORON   CADMIUM
 FROM                     N       PO4       PO4         C        CL   AS,DISS   BA,DISS   BE,DISS    B,DISS   CD,DISS
  TO                   MG/L      MG/L      MG/L      MG/L      MG/L      UG/L      UG/L      UG/L      UG/L      UG/L
65/ 8/12
       NUMBER                                                      17
       MAXIMUM                                                     5.
       MINIMUM                                                     2.
       MEAN                                                        4.
       LOG MEAN                                                    4.
65/ 9/ 3
**********************************************************************************************************************
                      01070     01075     01080     01085     01090     01105     31501     31505     31615     31616
 DATE  PARAMETER     PHOS-T    SILVER  STRONTUM  VANADIUM      ZINC  ALUMINUM  TOT COLI  TOT COLI  FEC COLI  FEC COLI
 FROM                P-SPEC   AG,DISS   SR,DISS    V,DISS   ZN,DISS    AL,TOT  MFIMENDO  MPN CONF  MPNECMED  MFM-FCBR
  TO ,                 UG/L      UG/L      UG/L      UG/L      UG/L      UG/L    /100ML    /100ML    /100ML    /100ML
65/ 8/12
       NUMBER                                                                                  17        17
       MAXIMUM                                                                            130000.     4900.
       MINIMUM                                                                              3300.      200.
       MEAN                                                                                30171.     2076.
       LOG MEAN                                                                            18696.     1302.
65/ 9/ 3
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       WEST POINT STUDY                                              121980          CH-11
       SOUTHEAST REGION
       CHATTAHOOCHEE. RIVER                                         NEW R US 27 S OF FRANKLIN
                                                                    13 GEORGIA
                                                                    SOUTHEAST
                                                                    CHATTAHOOCHEE
                                                                    11135050              2111204

************************************************************************************************************************
                      00002      00007      00010      00020      00060      00070      00095      00300      00301      00304
  DATE  PARAMETER    HSAMPLOC   DISTANCE    WATER       AIR       STREAM      TURB     CNDUCTVY      DO         DO        BOD
  FROM                % FROM      FR Y       TEMP       TEMP       FLOW       JKSN      AT 25C                SATUR      2 DAY
   TO                RT BANK     MILES       CENT       CENT     CUFT/SEC      JU      MICROMHO     MG/L      PERCENT      MG/L

65/ 9/ 7
        NUMBER                                 15                                                     15         15
        MAXIMUM                              24.0                                                    8.3       94.0
        MINIMUM                              14.0                                                    6.8       75.0
        MEAN                                 20.3                                                    7.7       84.1
        LOG MEAN                             20.0                                                    7.7       84.0
65/ 9/29
************************************************************************************************************************
                      00305      00310      00400      00403      00410      00500      00515      00530      00610      00625
  DATE  PARAMETER      BOD        BOD         PH        LAR       T ALK     RESIDUE    RESIDUE    RESIDUE    AMMONIA    TOT KJEL
  FROM                3 DAY      5 DAY                   PH       CACO3      TOTAL     DISS-105   TOT NFLT    NH3-N        N
   TO                  MG/L       MG/L        SU         SU        MG/L       MG/L     C   MG/L      MG/L       MG/L       MG/L

65/ 9/ 7
        NUMBER                      15         15                    15
        MAXIMUM                    1.8       7.40                   43.
        MINIMUM                    0.4       6.70                   29.
        MEAN                       1.2       7.08                   36.
        LOG MEAN                   1.1       7.08                   36.
65/ 9/29
************************************************************************************************************************
                      00630      00650      00653      00680      00940      01000      01005      01010      01020      01025
  DATE  PARAMETER    NO2&NO3     T PO4     SOLPO4-T   T ORG C    CHLORIDE   ARSENIC     BARIUM    BERYLIUM    BORON     CADMIUM
  FROM                  N         PO4        PO4         C          CL      AS.DISS    BA.DISS    BE.DISS     B.DISS    CD.DISS
   TO                  MG/L       MG/L       MG/L       MG/L       MG/L       UG/L       UG/L       UG/L       UG/L       UG/L

65/ 9/ 7
        NUMBER                                                       15
        MAXIMUM                                                      5.
        MINIMUM                                                      2.
        MEAN                                                         3.
        LOG MEAN                                                     3.
65/ 9/29
************************************************************************************************************************
                      01070      01075      01080      01085      01090      01105      31501      31505      31615      31616
  DATE  PARAMETER     PHOS-T     SILVER    STRONTUM   VANADIUM     ZINC     ALUMINUM   TOT COLI   TOT COLI   FEC COLI   FEC COLI
  FROM                P-SPEC    AG.DISS    SR.DISS     V.DISS    ZN.DISS     AL.TOT    MFIMENDO   MPN CONF   MPNECMED   MFM-FCBR
   TO                  UG/L       UG/L       UG/L       UG/L       UG/L       UG/L      /100ML     /100ML     /100ML     /100ML

65/ 9/ 7
        NUMBER                                                                                        15         15
        MAXIMUM                                                                                    7900.      1700.
        MINIMUM                                                                                    1100.       200.
        MEAN                                                                                       3067.       473.
        LOG MEAN                                                                                   2629.       348.
65/ 9/29
************************************************************************************************************************
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WEST POINT STUDY                                        121992       CH-12
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                   CHATT R AT US 27 FRNKLN
                                                       13 GEORGIA
                                                       SOUTHEAST
                                                       CHATTAHOOCHEE       C-1    GDPH 15
                                                       11135050            6111204

******************************************************************************************************************************
                          00002      00007      00010      00020      00060      00070      00095      00300      00301      00304
 DATE  PARAMETER       HSAMPLOC   DISTANCE      WATER        AIR     STREAM       TURB   CNDUCTVY         DO         DO        BOD
 FROM                    % FROM       FR Y       TEMP       TEMP       FLOW       JKSN     AT 25C                 SATUR      2 DAY
  TO                    RT BANK      MILES       CENT       CENT   CUFT/SEC         JU   MICROMHO       MG/L    PERCENT       MG/L

65/ 9/ 7
      NUMBER                                       15                                                       15         15
      MAXIMUM                                    27.0                                                      8.1       88.0
      MINIMUM                                    19.0                                                      4.8       55.0
      MEAN                                       23.1                                                      6.4       73.7
      LOG MEAN                                   22.9                                                      6.4       73.2
65/ 9/29
******************************************************************************************************************************
                          00305      00310      00400      00403      00410      00500      00515      00530      00610      00625
 DATE  PARAMETER            BOD        BOD         PH        LAB      T ALK    RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL
 FROM                     3 DAY      5 DAY                    PH      CACO3      TOTAL   DISS-105   TOT NFLT      NH3-N          N
  TO                       MG/L       MG/L         SU         SU       MG/L       MG/L   C   MG/L       MG/L       MG/L       MG/L

65/ 9/ 7
      NUMBER                            15         15                    15
      MAXIMUM                          3.6       6.80                   19.
      MINIMUM                          0.8       6.20                   11.
      MEAN                             2.2       6.51                   14.
      LOG MEAN                         2.0       6.50                   14.
65/ 9/29
******************************************************************************************************************************
                          00630      00650      00653      00680      00940      01000      01005      01010      01020      01025
 DATE  PARAMETER        NO2&NO3      T PO4   SOLPO4-T    T ORG C   CHLORIDE    ARSENIC     BARIUM   BERYLIUM      BORON    CADMIUM
 FROM                         N        PO4        PO4          C         CL    AS.DISS    BA.DISS    BE.DISS     B.DISS    CD.DISS
  TO                       MG/L       MG/L       MG/L       MG/L       MG/L       UG/L       UG/L       UG/L       UG/L       UG/L

65/ 9/ 7
      NUMBER                                                             15
      MAXIMUM                                                            6.
      MINIMUM                                                            3.
      MEAN                                                               5.
      LOG MEAN                                                           4.
65/ 9/29
******************************************************************************************************************************
                          01070      01075      01080      01085      01090      01105      31501      31505      31615      31616
 DATE  PARAMETER         PHOS-T     SILVER   STRONTUM   VANADIUM       ZINC   ALUMINUM   TOT COLI   TOT COLI   FEC COLI   FEC COLI
 FROM                    P-SPEC    AG.DISS    SR.DISS     V.DISS    ZN.DISS     AL.TOT   MFIMENDO   MPN CONF   MPNECMED   MFM-FCBR
  TO                       UG/L       UG/L       UG/L       UG/L       UG/L       UG/L     /100ML     /100ML     /100ML     /100ML

65/ 9/ 7
      NUMBER                                                                                               15         15
      MAXIMUM                                                                                         540000.    110000.
      MINIMUM                                                                                           2300.       200.
      MEAN                                                                                             81840.     10813.
      LOG MEAN                                                                                         17620.      1840.
65/ 9/29
******************************************************************************************************************************
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        WEST POINT STUDY                                                 121983
        SOUTHEAST REGION
        CHATTAHOOCHEE, RIVER                                            NEW R COUNTY S2015   CORINTH
                                                                        13 GEORGIA
                                                                        SOUTHEAST
                                                                        CHATTAHOOCHEE
                                                                        11135050            2111204

**************************************************************************************************************************
                           00002     00007     00010     00020     00060     00070     00095     00300     00301     00304
 DATE  PARAMETER        HSAMPLOC  DISTANCE     WATER       AIR    STREAM      TURB  CNDUCTVY        DO        DO       BOD
 FROM                     % FROM      FR Y      TEMP      TEMP      FLOW      JKSN    AT 25C                SATUR     2 DAY
  TO                     RT BANK     MILES      CENT      CENT  CUFT/SEC        JU  MICROMHO      MG/L   PERCENT      MG/L

65/ 9/ 7
        NUMBER                                    15                                                  15        15
        MAXIMUM                                 24.0                                                 7.7      86.0
        MINIMUM                                  1.8                                                 6.0      68.0
        MEAN                                    19.3                                                 7.1      77.2
        LOG MEAN                                17.3                                                 7.0      77.1
65/ 9/29
**************************************************************************************************************************
                           00305     00310     00400     00403     00410     00500     00515     00530     00610     00625
 DATE  PARAMETER             BOD       BOD        PH       LAB     T ALK   RESIDUE   RESIDUE   RESIDUE   AMMONIA  TOT KJEL
 FROM                      3 DAY     5 DAY                  PH     CACO3     TOTAL  DISS-105  TOT NFLT     NH3-N         N
  TO                        MG/L      MG/L        SU        SU      MG/L      MG/L  C   MG/L      MG/L      MG/L      MG/L

65/ 9/ 7
        NUMBER                          14        15                  14
        MAXIMUM                        2.2      7.40                 55.
        MINIMUM                        0.4      6.80                 33.
        MEAN                           1.4      7.06                 45.
        LOG MEAN                       1.2      7.06                 44.
65/ 9/29
**************************************************************************************************************************
                           00630     00650     00653     00680     00940     01000     01005     01010     01020     01025
 DATE  PARAMETER         NO2&NO3     T PO4  SOLPO4-T   T ORG C  CHLORIDE   ARSENIC    BARIUM  BERYLIUM     BORON   CADMIUM
 FROM                          N       PO4       PO4         C        CL   AS,DISS   BA,DISS   BE,DISS    B,DISS   CD,DISS
  TO                        MG/L      MG/L      MG/L      MG/L      MG/L      UG/L      UG/L      UG/L      UG/L      UG/L

65/ 9/ 7
        NUMBER                                                        14
        MAXIMUM                                                       4.
        MINIMUM                                                       3.
        MEAN                                                          4.
        LOG MEAN                                                      4.
65/ 9/29
**************************************************************************************************************************
                           01070     01075     01080     01085     01090     01105     31501     31505     31615     31616
 DATE  PARAMETER          PHOS-T    SILVER  STRONTUM  VANADIUM      ZINC  ALUMINUM  TOT COLI  TOT COLI  FEC COLI  FEC COLI
 FROM                     P-SPEC   AG,DISS   SR,DISS    V,DISS   ZN,DISS    AL,TOT  MFIMENDO  MPN CONF  MPNECMED  MFM-FCBR
  TO                        UG/L      UG/L      UG/L      UG/L      UG/L      UG/L    /100ML    /100ML    /100ML    /100ML

65/ 9/ 7
        NUMBER                                                                                        14        14
        MAXIMUM                                                                                  130000.     1700.
        MINIMUM                                                                                     700.      200.
        MEAN                                                                                      17014.      450.
        LOG MEAN                                                                                   7801.      340.
65/ 9/29
**************************************************************************************************************************
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WEST POINT STUDY                                                 121990
SOUTHEAST REGION
CHATTAHOOCHEC, RIVER                                             CHATTAHOOCHEE AT US HWY 27 FRNKL
                                                                 13 GEORGIA
                                                                 SOUTHEAST
                                                                 CHATTAHOOCHEE        C-1
                                                                 11135050             2111204

**********************************************************************************************************************************
                          00002      00007      00010      00020      00060      00070      00095      00300      00301      00304
  DATE  PARAMETER      MSAMPLOC   DISTANCE      WATER        AIR     STREAM       TURB   CNDUCTVY         DO         DO        BOD
  FROM                   % FROM       FR Y       TEMP       TEMP       FLOW       JKSN     AT 25C                 SATUR      2 DAY
   TO                   RT BANK      MILES       CENT       CENT   CUFT/SEC         JU   MICROMHO       MG/L    PERCENT       MG/L
64/10/19
        NUMBER                                     27         13         29                    14         22         21
        MAXIMUM                                  20.0       25.0      7150.                   70.       10.6      100.0
        MINIMUM                                   2.8        8.0      1860.                   39.        7.0       74.0
        MEAN                                     13.2       17.8      3666.                   57.        8.8       82.1
        LOG MEAN                                 11.4       16.8      3257.                   56.        8.8       81.8
66/ 2/ 6
**********************************************************************************************************************************
                          00305      00310      00400      00403      00410      00500      00515      00530      00610      00625
  DATE  PARAMETER           BOD        BOD         PH        LAB      T ALK    RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL
  FROM                    3 DAY      5 DAY                    PH      CACO3      TOTAL   DISS-105   TOT NFLT      NH3-N          N
   TO                      MG/L       MG/L         SU         SU       MG/L       MG/L  C    MG/L       MG/L       MG/L       MG/L
64/10/19
        NUMBER                          7         21                    14
        MAXIMUM                       4.2       7.00                   18.
        MINIMUM                       1.8       6.50                   10.
        MEAN                          2.7       6.84                   15.
        LOG MEAN                      2.6       6.84                   15.
66/ 2/ 6
**********************************************************************************************************************************
                          00630      00650      00653      00680      00940      01000      01005      01010      01020      01025
  DATE  PARAMETER       NO2&NO3      T PO4   SOLPO4-T    T ORG C   CHLORIDE    ARSENIC     BARIUM   BERYLIUM      BORON    CADMIUM
  FROM                        N        PO4        PO4          C         CL    AS,DISS    BA,DISS    BE,DISS     B,DISS    CD,DISS
   TO                      MG/L       MG/L       MG/L       MG/L       MG/L       UG/L       UG/L       UG/L       UG/L       UG/L
64/10/19
        NUMBER                                                           2
        MAXIMUM                                                         4.
        MINIMUM                                                         3.
        MEAN                                                            3.
        LOG MEAN                                                        3.
66/ 2/ 6
**********************************************************************************************************************************
                          01070      01075      01080      01085      01090      01105      31501      31505      31615      31616
  DATE  PARAMETER        PHOS-T     SILVER   STRONTUM   VANADIUM       ZINC   ALUMINUM   TOT COLI   TOT COLI   FEC COLI   FEC COLI
  FROM                   P-SPEC    AG,DISS    SR,DISS     V,DISS    ZN,DISS     AL,TOT   MFIMENDO   MPN CONF   MPNECMED   MFM-FCBR
   TO      1               UG/L       UG/L       UG/L       UG/L       UG/L       UG/L     /100ML     /100ML     /100ML     /100ML
64/10/19
        NUMBER                                                                                  7         44          7          7
        MAXIMUM                                                                           205000.   1600000.     23000.      6600.
        MINIMUM                                                                           155000.     15000.      5000.      1400.
        MEAN                                                                              234296.    320560.     14714.      4238.
        LOG MEAN                                                                          226971.    175250.     13478.      3623.
66/ 2/ 6
**********************************************************************************************************************************
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APPENDIX D

A Brief Biological Survey of the Chattahoochee River and Selected Tributary Streams

by

William M. Beck, Jr.

June 1965

During June 1965 a brief biological survey was made of the Chattahoochee River and selected tributary streams for the purpose of determining the biological quality of the waters in question. This survey was requested by the Atlanta office of the Public Health Service. . . .

The period selected for this survey was predictably ideal in light of weather records for past years but, unfortunately, proved to be a time of unseasonably high rainfall, at least for the early part of the survey. This resulted in many of the proposed areas of the Chattahoochee River, especially in the middle and lower sections, proving to be either inaccessible or unworkable.

Results are presented in Table I which gives station numbers, locations, and condition. It was felt that use of any scheme for reporting (the Biotic Index, for example) was hardly worth while in view of the fact that the Chattahoochee River within the area of this survey has reaches that are typical trout streams as well as areas under impoundment with no flow at all. In this report condition will be given as fine, satisfactory, questionable, poor, and grossly polluted. In addition, certain conditional terms will be marked with an asterisk. This designates the fact that these particular evaluations need further discussion.

TABLE I

Station		Stream	County	State	Condition
C-1	6-18	Chattahoochee R.	White	Ga.	Fine
C-2	6-18	Chattahoochee R.	White	Ga.	Fine
C-3	6-19	Chattahoochee R.	Gwinnett	Ga.	Satisfactory*
C-4	6-20	Chattahoochee R.	Fulton	Ga.	Fine
C-5	6-20	Chattahoochee R.	Cobb	Ga.	Grossly polluted sewage
C-6	6-20	Sweetwater Creek	Douglas	Ga.	Fine

TABLE I (cont'd)

Station	Stream	County	State	Condition
C-7**6-21	Chattahoochee R.	Heard	Ga.	Questionable
C-8**6-21	Yellowjacket Cr.	Troup	Ga.	Fine
C-9 6-21	Long Cane Creek	Troup	Ga.	Questionable*
C-10 6-22	Flat Shoals Cr.	Harris	Ga.	Fine
C-11 6-22	Sand Creek	Harris	Ga.	Fine
C-12 6-22	Mulberry Creek	Harris	Ga.	Satisfactory
C-13 6-23	Chattahoochee R.	Chattahoochee	Ga.	Questionable*
C-14 6-23	Chattahoochee R.	Chattahoochee	Ga.	Questionable*
C-15 6-23	Upatoie Creek	Chattahoochee	Ga.	Satisfactory
C-16 6-24	Uchee Creek	Russell	Ala.	Fine
C-17 6-24	S. Fork Cowikee Creek	Barbour	Ala.	Satisfactory
C-18 6-25	Pataula Creek	Quitman	Ga.	Satisfactory
C-19 6-25	Small Creek	Quitman	Ga.	Fine
C-20 6-25	Chattahoochee R.	Henry	Ala.	Questionable*
C-21 6-25	Abbie Creek	Henry	Ala.	Fine
C-22 6-25	Chattahoochee R.	Houston	Ala.	Poor
C-23 6-25	Chattahoochee R.	Houston	Ala.	Grossly polluted
C-24 6-25	Chattahoochee R.	Jackson	Fla.	Satisfactory

** Correspond to Stations 12 and 8, respectively, in 1971 EPA report.

. . . To summarize briefly, the Chattahoochee River was found to be grossly polluted at stations C-5 and C-23, evidence of lesser pollution was found at stations C-7, C-13, and C-14, the remaining stations in this river proving to be in satisfactory condition. . . .

Location of Stations for Report by William M. Beck, Jr., June, 1965. "A Brief Biological Survey of the Chattahoochee River and Selected Tributary Streams." by Wilburn F. Holsomback

Station & STORET No.	Stream	Location
C-7	Chattahoochee River	Inside City of Franklin, Georgia, at bridge on Ga. Hwy. 1 in Heard County.
C-8	Yellowjacket Creek	County Rd. (Mill Wares Rd.) approx. 4 miles N.W. of LaGrange, Ga. 1 mile W. of water works in Troup County.

RAW DATA

Chattahoochee River, Station C-7, Heard County, Georgia:

Class I: --

Class II: Amphipoda

Class III: Physa, Sphaeriidae, 2 Oligochaeta

Class IV: bettle ad., Veliidae

Class V: Hirudinea, mayfly n.

Yellowjacket Creek, Station C-8, Troup County, Georgia:

Class I: Stenonema, Simuliidae, Psectrocladius

Class II: Gomphus, Cheumatopsyche, Hyalella azteca, Procladius

Class III: Oligochaeta, Ceratopogonidae

Class IV: Veliidae, Corixidae, Gerridae, bettle larvae, Elmid ad.

Class V: Hexagenia, Hirudinea, 4 mayfly n., Atherix, Crypotochironomus, Polypedilum, Tanytarsus

APPENDIX E

Statistical Summary of Water Quality Data
Chattahoochee River Basin
August and September 1970

```
WEST POINT STUDY                                                       121910-A        CH-014
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                                 CHATTA R WEST POINT ABOVE US29
                                                                        GEORGIA
                                                                     SOUTHEAST
                                                                     CHATTAHOOCHEE
                                                                     1113S050             2111204

*****************************************************************************************************************
 DATE  PARAMETER     00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 FROM              HSAMPLOC    WATER       DO      T ALK      LAB    CNDUCTVY    TURB      COLOR      BOD       BOD
  TO               % FROM      TEMP               CACO3       PH     AT 25C      JKSN                5 DAY     2 DAY
                   RT BANK     CENT      MG/L      MG/L       SU    MICROMHO      JU     PT-CO-U     MG/L      MG/L
70/ 8/11
        NUMBER          10        10        10        10        10        10        10        10         3         1
        MAXIMUM        33.      28.0       7.4       18.       7.1       78.       78.       30.       0.6       0.4
        MINIMUM        33.      23.0       5.2       13.       6.8       41.       12.       10.       0.4       0.4
        MEAN           33.      24.3       6.6       15.       6.9       58.       42.       16.       0.5       0.4
        LOG MEAN       33.      24.3       6.6       15.       6.9       57.       36.       14.       0.5       0.4
70/ 9/18
*****************************************************************************************************************
 DATE  PARAMETER     00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 FROM              T PO4     SOLPO4-T   TOT KJEL  AMMONIA   NO2&NO3  CHLORIDE  T ORG C   RESIDUF   RESIDUF   RESIDUE
  TO                 PO4       PO4         N      NH3-N        N        CL        C       TOTAL    DISS-105  TOT NFLT
                    MG/L      MG/L       MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C  MG/L     MG/L
70/ 8/11
        NUMBER          10        10        10        10        10        10        10        10        10        10
        MAXIMUM       0.41      0.26     0.670     0.480       0.6        4.       6.0      163.       99.       68.
        MINIMUM       0.23      0.10     0.220     0.020       0.5        3.       3.0       45.       14.       19.
        MEAN          0.30      0.16     0.432     0.233       0.6        4.       4.5      100.       53.       46.
        LOG MEAN      0.30      0.15     0.402     0.186       0.6        4.       4.4       93.       47.       44.
70/ 9/18
*****************************************************************************************************************
 DATE  PARAMETER     01045     01046     01055     01056     31501     31616
 FROM                IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
  TO                TOTAL    FE.DISS      MN     MN.DISS   IMEDENDO  MF-C44.5
                     UG/L      UG/L      UG/L      UG/L   MF/100ML  MF/100ML
70/ 8/11
        NUMBER          10        10        10        10         8         9
        MAXIMUM      6300.      200.     340.0      70.0    21000.     1300.
        MINIMUM       600.      100.      60.0      20.0      500.       10.
        MEAN         3190.      157.     182.0      39.0     9825.      634.
        LOG MEAN     2475.      152.     165.9      35.6     6412.      359.
70/ 9/18
*****************************************************************************************************************
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WEST POINT STUDY                                              121910-8      CH-019
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                         CHATTA R WEST POINT ABOVE US29
                                                             13 GEORGIA
                                                             SOUTHEAST
                                                             CHATTAHOOCHEE
                                                             1113S050            2111204

**************************************************************************************************************************
 DATE  PARAMETER        00002     00010      00300      00410      00403      00095      00070      70515      00310      00304
 FROM                 HSAMPLOC    WATER       DO        T ALK       LAB      CNDUCTVY    TURB      COLOR       BOD        BOD
  TO                  % FROM      TEMP                  CACO3       PH       AT 25C      JKSN                  5 DAY      2 DAY
                      RT BANK     CENT       MG/L       MG/L        SU      MICROMHO     JU       PT-CO-U      MG/L       MG/L
70/ 8/11
         NUMBER          10         10         10         10         10         10         10         10          3          2
         MAXIMUM        66.       28.0        7.5        19.        7.1        82.        71.        30.        0.8        0.2
         MINIMUM        66.       23.0        5.6        14.        6.6        51.        12.        10.        0.2        0.2
         MEAN           66.       24.3        6.7        15.        6.9        61.        37.        18.        0.5        0.2
         LOG MEAN       66.       24.3        6.6        15.        6.9        61.        31.        16.        0.4        0.2
70/ 9/18
**************************************************************************************************************************
 DATE  PARAMETER        00650     00653      00625      00610      00630      00940      00680      00500      00515      00530
 FROM                  T PO4    SOLPO4-T   TOT KJEL    AMMONIA    NO2&NO3   CHLORIDE   T ORG C    RESIDUE    RESIDUE    RESIDUE
  TO                    PO4       PO4         N         NH3-N        N          CL         C        TOTAL     DISS-105   TOT NFLT
                        MG/L      MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L     C   MG/L     MG/L
70/ 8/11
         NUMBER          10         10         10         10         10         10         10         10         10         10
         MAXIMUM       0.42       0.26      0.630      0.330        0.6         4.        5.0       154.        86.        68.
         MINIMUM       0.20       0.08      0.270      0.110        0.5         3.        2.0        45.        10.        26.
         MEAN          0.29       0.15      0.371      0.219        0.6         4.        3.4        96.        51.        45.
         LOG MEAN      0.28       0.15      0.357      0.206        0.6         3.        3.2        90.        43.        44.
70/ 9/18
**************************************************************************************************************************
 DATE  PARAMETER        01045     01046      01055      01056      31501      31616
 FROM                   IRON      IRON     MANGNESE   MANGNESE   COLIFORM   FEC COLI
  TO                    TOTAL    FE.DISS       MN      MN.DISS   IMEDENDO   MF-C44.5
                        UG/L      UG/L       UG/L       UG/L     MF/100ML   MF/100ML
70/ 8/11
         NUMBER          10         10         10         10          9          9
         MAXIMUM      6000.       250.      310.0       80.0     20000.      2000.
         MINIMUM       700.       100.       80.0       20.0      1200.       130.
         MEAN         3450.       174.      189.0       48.0     11544.       897.
         LOG MEAN     2654.       166.      173.8       42.5      9240.       617.
70/ 9/18
**************************************************************************************************************************
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WEST POINT STUDY                                                  121911-A        CH-02A
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                             CHATTAHOOCHEE R AT HARDLEY CR MO
                                                                    GEORGIA
                                                                 SOUTHEAST
                                                                 CHATTAHOOCHEE
                                                                 1113S050          2111204

****************************************************************************************************************************
                        00002     00010     00300     00410     00403     00095      00070     70515     00310     00304
 DATE   PARAMETER      HSAMPLOC   WATER      DO       T ALK      LAB     CNDUCTVY    TURB      COLOR      BOD       BOD
 FROM                  % FROM     TEMP               CACO3       PH      AT 25C      JKSN                5 DAY     2 DAY
  TO                   RT BANK    CENT      MG/L      MG/L       SU     MICROMHO     JU      PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER              9         8         8         9         9          9         9         9         1         1
        MAXIMUM           33.      28.0       7.4       17.       7.0        78.       63.       30.       0.6       0.3
        MINIMUM           33.      23.0       5.6       13.       6.8        47.       16.       10.       0.6       0.3
        MEAN              33.      24.1       6.6       14.       6.9        58.       37.       17.       0.6       0.3
        LOG MEAN          33.      24.1       6.6       14.       6.9        58.       33.       15.       0.6       0.3
70/ 9/18
****************************************************************************************************************************
                        00650     00653     00625     00610     00630     00940      00680     00500     00515     00530
 DATE   PARAMETER      T PO4    SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                   PO4       PO4        N        NH3-N       N         CL         C       TOTAL    DISS-105  TOT NFLT
  TO                    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L       MG/L      MG/L     C   MG/L    MG/L

70/ 8/11
        NUMBER              7         8         7         7         7          7         7         8         8         8
        MAXIMUM          0.40      0.26     0.390     0.330       0.6         4.       7.0      166.       87.       79.
        MINIMUM          0.22      0.09     0.210     0.010       0.5         3.       2.0       54.       22.       24.
        MEAN             0.31      0.16     0.307     0.186       0.6         4.       4.0      100.       51.       48.
        LOG MEAN         0.30      0.16     0.302     0.133       0.6         4.       3.7       94.       48.       45.
70/ 9/18
****************************************************************************************************************************
                        01045     01046     01055     01056     31501      31616
 DATE   PARAMETER       IRON      IRON    MANGNESE  MANGNESE  COLIFORM   FEC COLI
 FROM                   TOTAL   FE.DISS      MN     MN.DISS   IMEDENDO   MF-C44.5
  TO                    UG/L      UG/L      UG/L      UG/L    MF/100ML   MF/100ML

70/ 8/11
        NUMBER              7         8         7         8         8          8
        MAXIMUM         6800.      300.     280.0      80.0    27000.      1600.
        MINIMUM          700.      100.      90.0      30.0     2400.       100.
        MEAN            3114.      178.     161.4      43.8    12113.       726.
        LOG MEAN        2478.      165.     151.9      41.4     8907.       503.
70/ 9/18
****************************************************************************************************************************
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WEST POINT STUDY                                                     121911-8       CH-028
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                                 CHATTAHOOCHEE R AT HARDLEY CR MO
                                                                     13 GEORGIA
                                                                     SOUTHEAST
                                                                     CHATTAHOOCHEE
                                                                     11135050            2111204

***********************************************************************************************************************
                       00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE  PARAMETER     HSAMPLOC   WATER       DO       T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
 FROM                 + FROM     TEMP                CACO3       PH      AT 25C     JKSN               5 DAY     2 DAY
  TO                 RT BANK     CENT      MG/L      MG/L        SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
       NUMBER              9         8         8         9         9         9         9         9         2         1
       MAXIMUM           66.      24.0       7.4       17.       7.0       77.       78.       35.       0.5       1.6
       MINIMUM           66.      23.0       5.6       14.       6.9       47.       12.       10.       0.4       1.6
       MEAN              66.      24.1       6.6       15.       7.0       58.       40.       18.       0.4       1.6
       LOG MEAN          66.      24.1       6.6       15.       7.0       57.       34.       16.       0.4       1.6
70/ 9/18
***********************************************************************************************************************
                       00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 DATE  PARAMETER       T PO4   SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                   PO4       PO4        N       NH3-N        N        CL         C       TOTAL   DISS-105  TOT NFLT
  TO                   MG/L      MG/L      MG/L      MG/L       MG/L      MG/L      MG/L      MG/L    C   MG/L    MG/L

70/ 8/11
       NUMBER              7         7         7         7         7         7         7         8         8         8
       MAXIMUM          0.41      0.25     0.560     0.290       0.7        4.       5.0      159.       93.       69.
       MINIMUM          0.22      0.09     0.260     0.130       0.5        3.       3.0       54.       18.       28.
       MEAN             0.32      0.16     0.349     0.204       0.6        4.       4.0       97.       50.       48.
       LOG MEAN         0.31      0.16     0.338     0.199       0.6        4.       3.9       93.       45.       46.
70/ 9/18
***********************************************************************************************************************
                       01045     01046     01055     01056     31501     31616
 DATE  PARAMETER       IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                  TOTAL   FE.DISS       MN    MN.DISS   IMMEDENDO MF-C44.5
  TO                   UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
       NUMBER              7         8         7         7         8         8
       MAXIMUM         7400.      800.     310.0      90.0    40000.     2200.
       MINIMUM          750.      100.      70.0      10.0     2000.       90.
       MEAN            3107.      258.     172.9      51.4    15550.      979.
       LOG MEAN        2402.      200.     156.0      43.3     9742.      747.
70/ 9/18
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WEST POINT STUDY                                              121913-A        CH-03A
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                          CHATTAHOOCHEE R AT MAPLE CK. MO.
                                                              13 GEORGIA
                                                              SOUTHEAST
                                                              CHATTAHOOCHEE
                                                              11135050              2111204

*************************************************************************************************************************
                      00002      00010      00300      00410      00403      00095      00070      70515      00310      00304
 DATE   PARAMETER   %SAMPLOC     WATER       DO        T ALK       LAB     CNDUCTVY     TURB      COLOR       BOD        BOD
 FROM                % FROM      TEMP                  CACO3       PH       AT 25C      JKSN                 5 DAY      2 DAY
  TO                 RT BANK     CENT       MG/L       MG/L        SU      MICROMHO      JU      PT-CO-U      MG/L       MG/L
70/ 8/11
          NUMBER           9          9          9          9          9          9          9          9          2          2
          MAXIMUM        33.       28.0        7.6        16.        7.0        77.        73.        30.        0.7        0.4
          MINIMUM        33.       23.0        5.5        13.        6.8        49.        12.        10.        0.4        0.1
          MEAN           33.       24.2        6.7 -      14.        6.9        57.        41.        17.        0.5        0.2
          LOG MEAN       33.       24.2        6.7        14.        6.9        57.        35.        15.        0.5        0.2
70/ 9/18
*************************************************************************************************************************
                      00650      00653      00625      00610      00630      00940      00680      00500      00515      00530
 DATE   PARAMETER     T PO4    SOLPO4-T   TOT KJEL   AMMONIA    NO2&NO3   CHLORIDE   T ORG C    RESIDUE    RESIDUE    RESIDUE
 FROM                  PO4        PO4         N       NH3-N        N          CL         C        TOTAL    DISS-105   TOT NFLT
  TO                  MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L    C   MG/L     MG/L
70/ 8/11
          NUMBER           8          9          8          8          8          8          8          9          9          9
          MAXIMUM       0.43       0.26      0.600      0.370        0.6         4.        6.0       166.        98.        68.
          MINIMUM       0.22       0.00      0.200      0.100        0.5         3.        3.0        72.        24.        34.
          MEAN          0.32       0.15      0.334      0.216        0.6         4.        4.5       105.        55.        50.
          LOG MEAN      0.32       0.11      0.317      0.202        0.6         4.        4.4       102.        51.        49.
70/ 9/18
*************************************************************************************************************************
                      01045      01046      01055      01056      31501      31616
 DATE   PARAMETER      IRON       IRON     MANGNESE   MANGNESE   COLIFORM   FEC COLI
 FROM                 TOTAL     FE.DISS       MN      MN.DISS    IMEDENDO   MF-C44.5
  TO                   UG/L       UG/L       UG/L       UG/L     MF/100ML   MF/100ML
70/ 5/11
          NUMBER           8          9          8          9          8          8
          MAXIMUM      7900.       270.      300.0       90.0     33000.      2200.
          MINIMUM      1200.       130.       90.0       30.0      2800.       140.
          MEAN         3963.       201.      183.8       56.7     14888.      1056.
          LOG MEAN     3287.       197.      171.5       52.8     11429.       760.
70/ 9/18
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WEST POINT STUDY                                            121913-8       CH-038
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                       CHATTAHOOCHEE R AT MAPLE CR. MO.
                                                           13 GEORGIA
                                                           SOUTHEAST
                                                           CHATTAHOOCHEE
                                                           11135050           2111204

*****************************************************************************************************
                   00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE  PARAMETER  HSAMPLOC   WATER      DO       T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
 FROM              % FROM    TEMP               CACO3       PH      AT 25C     JKSN               5 DAY     2 DAY
  TO               RT BANK   CENT      MG/L      MG/L       SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER          9         9         9         9         9         9         9         9         2         2
        MAXIMUM       66.      28.0       7.6       17.       7.0       75.       78.       30.       0.5       0.7
        MINIMUM       66.      23.0       5.6       13.       6.8       51.       14.       10.       0.3       0.5
        MEAN          66.      24.2       6.8       15.       7.0       58.       41.       17.       0.4       0.6
        LOG MEAN      66.      24.2       6.7       15.       7.0       58.       34.       15.       0.4       0.6
70/ 9/18
*****************************************************************************************************
                   00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 DATE  PARAMETER   T PO4   SOLPO4-T  TOT KJEL  AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM               PO4       PO4        N      NH3-N       N         CL        C       TOTAL   DISS-105  TOT NFLT
  TO               MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C  MG/L     MG/L

70/ 8/11
        NUMBER          8         9         8         8         8         8         8         9         9         9
        MAXIMUM      0.42      0.25     0.400     0.220       0.6        4.       6.0      157.       94.       69.
        MINIMUM      0.25      0.09     0.230     0.050       0.5        3.       2.0       63.       17.       27.
        MEAN         0.32      0.15     0.310     0.155       0.6        3.       4.1      101.       54.       47.
        LOG MEAN     0.31      0.15     0.306     0.142       0.6        3.       3.9       97.       48.       45.
70/ 9/18
*****************************************************************************************************
                   01045     01046     01055     01056     31501     31616
 DATE  PARAMETER    IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM              TOTAL    FE.DISS      MN     MN.DISS   IMEDENDO  MF-C44.5
  TO                UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER          8         9         8         9         7         8
        MAXIMUM     7600.      380.     320.0     100.0    24000.     1900.
        MINIMUM     1000.      130.      80.0      30.0     3800.      110.
        MEAN        3613.      219.     178.8      62.2    10014.      929.
        LOG MEAN    2799.      210.     162.8      58.5     8481.      584.
70/ 9/18
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WEST POINT STUDY                                            121919         CH-04
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                        WEHADKEE CR HWY 244 W LAGRANGE
                                                            13 GEORGIA
                                                            SOUTHEAST
                                                            CHATTAHOOCHEE
                                                            11135050            2111204

***********************************************************************************************************
                      00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE   PARAMETER   HSAMPLOC   WATER       DO      T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
 FROM               % FROM     TEMP               CACO3       PH      AT 25C     JKSN                5 DAY     2 DAY
  TO                RT BANK    CENT      MG/L      MG/L       SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER                   10        10        10        10        10        10        10         2         2
        MAXIMUM                27.0       8.5       23.       7.2       69.       70.       40.       0.4       0.3
        MINIMUM                22.5       7.3       18.       7.0       44.       20.       10.       0.4       0.1
        MEAN                   23.9       7.8       21.       7.1       55.       29.       22.       0.4       0.2
        LOG MEAN               23.9       7.8       21.       7.1       55.       26.       20.       0.4       0.2
70/ 9/18
***********************************************************************************************************
                      00650     00653     00525     00610     00630     00940     00680     00500     00515     00530
 DATE   PARAMETER     T PO4   SOLPO4-T  TOT KJEL  AMMONIA   NO2&NO3  CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                 PO4       PO4        N      NH3-N        N        CL         C       TOTAL   DISS-105  TOT NFLT
  TO                 MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C  MG/L     MG/L

70/ 8/11
        NUMBER          10        10        10        10        10        10        10        10        10        10
        MAXIMUM       0.08      0.02     0.630     0.300       0.2        3.      10.0      105.       51.       67.
        MINIMUM       0.01      0.00     0.140     0.010       0.2        2.       2.0       55.        5.       38.
        MEAN          0.03      0.01     0.275     0.141       0.2        2.       4.1       74.       22.       53.
        LOG MEAN      0.03      0.01     0.239     0.106       0.2        2.       3.7       73.       18.       52.
70/ 9/18
***********************************************************************************************************
                      01045     01046     01055     01056     31501     31616
 DATE   PARAMETER     IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                TOTAL    FE.DISS      MN     MN.DISS   IMEDENDO  MF-C44.5
  TO                 UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER          10        10        10        10         9         9
        MAXIMUM      7700.      500.     560.0     440.0    21000.      500.
        MINIMUM       800.      140.     100.0      10.0     1600.       95.
        MEAN         3090.      250.     375.0     199.0     6144.      195.
        LOG MEAN     2660.      235.     346.2     127.6     4315.      164.
70/ 9/18
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WEST POINT STUDY                                                        121920-A        CH-05A
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                                   CHATTAHOOCHEE R GA 238 W OF LAGR
                                                                       13 GEORGIA
                                                                       SOUTHEAST
                                                                       CHATTAHOOCHEE
                                                                       11135050          2111204

*****************************************************************************************************************
 DATE   PARAMETER     00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 FROM                HSAMPLOC  WATER       DO      T ALK      LAB    CNDUCTVY    TURB     COLOR      BOD       BOD
  TO                 % FROM     TEMP               CACO3      PH     AT 25C     JKSN                5 DAY     2 DAY
                     RT BANK    CENT      MG/L      MG/L      SU    MICROMHO     JU     PT-CO-U     MG/L      MG/L
70/ 9/11
        NUMBER           10        10        10        10        10        10        10        10         3         2
        MAXIMUM         33.      27.0       7.7       16.       7.1       69.      120.       35.       1.2       0.7
        MINIMUM         33.      22.5       6.1       14.       7.0       47.       15.       10.       0.7       0.4
        MEAN            33.      24.0       6.4       15.       7.0       59.       49.       16.       0.9       0.5
        LOG MEAN        33.      24.0       6.4       15.       7.0       59.       38.       14.       0.9       0.5
70/ 9/14
*****************************************************************************************************************
 DATE   PARAMETER     00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 FROM                T PO4    SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
  TO                  PO4       PO4        N       NH3-N        N         CL        C       TOTAL    DISS-105  TOT NFLT
                     MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L     C   MG/L    MG/L
70/ 9/11
        NUMBER           10        10        10        10        10        10        10        10        10        10
        MAXIMUM        0.45      0.20     0.460     0.300       0.7        4.      11.0      224.      166.       58.
        MINIMUM        0.22      0.01     0.210     0.010       0.0        3.       2.0       46.       11.       31.
        MEAN           0.32      0.13     0.327     0.169       0.5        3.       5.7      118.       73.       44.
        LOG MEAN       0.31      0.10     0.317     0.109       0.4        3.       5.2      106.       56.       44.
70/ 9/14
*****************************************************************************************************************
 DATE   PARAMETER     01045     01046     01055     01056     31501     31616
 FROM                 IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
  TO                 TOTAL    FE.DISS      MN     MN.DISS   IMFDENDO  MF-C44.5
                      UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML
70/ 9/11
        NUMBER           10        10        10        10         9         9
        MAXIMUM      16000.      260.     540.0     240.0    50000.     5100.
        MINIMUM        200.      100.      30.0      10.0     1900.      680.
        MEAN          5700.      170.     209.0      73.0    15856.     2052.
        LOG MEAN      3226.      161.     163.4      49.4    10925.     1500.
70/ 9/1-
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-123-

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WEST POINT STUDY                                             121920-8        CH-058
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                         CHATTAHOOCHEE R GA 238 W OF LAGR
                                                             13 GEORGIA
                                                             SOUTHEAST
                                                             CHATTAHOOCHEE
                                                             11135050           77777777

*************************************************************************************************************
 DATE  PARAMETER     00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 FROM               HSAMPLOC   WATER      DO       T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
  TO                & FROM     TEMP                CACO3      PH      AT 25C     JKSN               5 DAY     2 DAY
                    RT BANK    CENT      MG/L      MG/L       SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER         10        10        10        10        10        10        10        10         3         2
        MAXIMUM       66.      27.0       8.2       15.       7.1       67.      125.       35.       1.5       0.5
        MINIMUM       66.      22.0       6.1       14.       7.0       44.       15.       10.       0.7       0.5
        MEAN          66.      24.0       6.9       15.       7.1       59.       48.       16.       1.0       0.5
        LOG MEAN      66.      24.0       6.9       15.       7.1       59.       37.       14.       0.9       0.5
70/ 9/18
*************************************************************************************************************
 DATE  PARAMETER     00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 FROM               T PO4    SOLPO4-T  TOT KJEL  AMMONIA   NO2&NO3  CHLORIDE  T ORG C  RESIDUE   RESIDUE   RESIDUE
  TO                 PO4       PO4        N       NH3-N       N        CL        C       TOTAL   DISS-105  TOT NFLT
                     MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C  MG/L    MG/L

70/ 8/11
        NUMBER         10        10        10        10        10        10        10        10        10        10
        MAXIMUM      0.41      0.19     0.600     0.410       0.7        4.       7.0      202.      159.       59.
        MINIMUM      0.21      0.01     0.230     0.130       0.4        3.       3.0       52.       16.       27.
        MEAN         0.32      0.13     0.410     0.263       0.6        3.       4.8      109.       66.       43.
        LOG MEAN     0.31      0.10     0.392     0.250       0.6        3.       4.5      100.       53.       42.
70/ 9/18
*************************************************************************************************************
 DATE  PARAMETER     01045     01046     01055     01056     31501     31616
 FROM                IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
  TO                 TOTAL    FE.DISS     MN      MN.DISS  IMEDENDO  MF-C44.5
                     UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER         10        10        10        10         8         9
        MAXIMUM    15000.      280.     380.0      70.0    42000.     5200.
        MINIMUM     1000.      100.      70.0      10.0     2500.      440.
        MEAN        5180.      167.     183.0      47.0    15150.     1768.
        LOG MEAN    3488.      155.     164.1      41.7    10711.     1271.
70/ 9/18
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WEST POINT STUDY                                              121938-A       CH-04A
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                         CHATT R GA HWY 109 W OF LAGRANGE
                                                             13 GEORGIA
                                                             SOUTHEAST
                                                             CHATTAHOOCHEE
                                                             11135050           77777777

************************************************************************************************************************
 DATE   PARAMETER     00002      00010      00300      00410      00403      00095      00070      70515      00310      00304
 FROM                HSAMPLOC    WATER        DO       T ALK       LAB      CNDUCTVY    TURB       COLOR       BOD        BOD
  TO                 % FROM      TEMP                  CACO3        PH      AT 25C      JKSN                  5 DAY      2 DAY
                     RT BANK     CENT       MG/L       MG/L        SU      MICROMHO     JU       PT-CO-U      MG/L       MG/L

70/ 8/11
        NUMBER          10         10         10         10         10         10         10         10          3          2
        MAXIMUM         33.       25.5        8.4        20.        7.2        74.       100.        40.        1.1        0.7
        MINIMUM         33.       22.0        5.3        12.        7.1        46.        15.        10.        0.7        0.4
        MEAN            33.       23.9        7.1        17.        7.1        58.        46.        16.        0.9        0.5
        LOG MEAN        33.       23.9        7.0        16.        7.1        57.        38.        14.        0.9        0.5
70/ 9/18
************************************************************************************************************************
 DATE   PARAMETER     00650      00653      00625      00610      00630      00940      00680      00500      00515      00530
 FROM                 T PO4    SOLPO4-T   TOT KJEL   AMMONIA    NO2&NO3   CHLORIDE  T ORG C    RESIDUE    RESIDUE    RESIDUE
  TO                   PO4        PO4         N       NH3-N        N          CL         C        TOTAL     DISS-105   TOT NFLT
                      MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L     C  MG/L      MG/L

70/ 8/11
        NUMBER          10          9         10         10         10         10         10         10         10         10
        MAXIMUM        0.40       0.23      0.500      0.440        0.8         4.       10.0       189.       138.        63.
        MINIMUM        0.17       0.06      0.220      0.010        0.3         2.        2.0        54.        16.        15.
        MEAN           0.30       0.15      0.359      0.227        0.5         3.        5.6       113.        69.        44.
        LOG MEAN       0.29       0.14      0.347      0.174        0.5         3.        5.1       105.        60.        40.
70/ 9/18
************************************************************************************************************************
 DATE   PARAMETER     01045      01046      01055      01056      31501      31616
 FROM                 IRON       IRON     MANGNESE   MANGNESE   COLIFORM   FEC COLI
  TO                  TOTAL     FE,DISS      MN       MN,DISS   IMEDENDO   MF-C44.5
                      UG/L       UG/L       UG/L       UG/L     MF/100ML   MF/100ML

70/ 8/11
        NUMBER          10         10         10          9          8          9
        MAXIMUM      12800.       750.      570.0      230.0     36000.      4400.
        MINIMUM       1400.       110.      140.0       10.0     12000.      1300.
        MEAN          5540.       263.      283.0       76.7     20500.      2778.
        LOG MEAN      4240.       231.      261.8       58.8     18741.      2590.
70/ 9/18
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WEST POINT STUDY                                                          121938-8        CH-068
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                                     CHATT R GA HWY 109 W OF LAGRANGE
                                                                         13 GEORGIA
                                                                         SOUTHEAST
                                                                         CHATTAHOOCHEE
                                                                         11135050             77777777

**************************************************************************************************************
 DATE  PARAMETER     00002     00010      00300      00410     00403     00095     00070     70515     00310     00304
 FROM              HSAMPLOC   WATER        DO       T ALK      LAB     CNDUCTVY    TURB      COLOR      BOD       BOD
  TO                % FROM     TEMP                 CACO3       PH      AT 25C     JKSN                5 DAY     2 DAY
                   RT BANK     CENT       MG/L      MG/L        SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER          10        10          9        10        10        10        10        10         2         2
        MAXIMUM        66.      25.5        8.5       18.       7.1       71.      125.       45.       1.0       1.3
        MINIMUM        66.      22.0        6.2       12.       6.9       46.       15.       10.       0.8       0.7
        MEAN           66.      23.9        7.0       14.       7.1       57.       53.       16.       0.9       1.0
        LOG MEAN       66.      23.9        7.0       14.       7.1       57.       41.       14.       0.9       1.0
70/ 9/18
**************************************************************************************************************
                     00650     00653      00625     00610     00630     00940     00680     00500     00515     00530
 DATE  PARAMETER     T PO4   SOLPO4-T   TOT KJEL   AMMONIA   NO2&NO3  CHLORIDE   T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                 PO4       PO4         N       NH3-N       N         CL        C       TOTAL    DISS-105  TOT NFLT
  TO                 MG/L      MG/L       MG/L      MG/L      MG/L      MG/L      MG/L      MG/L     C  MG/L    MG/L

70/ 8/11
        NUMBER          10        10         10        10        10        10        10        10        10        10
        MAXIMUM       0.46      0.24      0.600     0.580       0.8        5.      13.0      215.      171.       68.
        MINIMUM       0.22      0.09      0.260     0.110       0.4        3.       3.0       52.       16.       21.
        MEAN          0.35      0.17      0.428     0.280       0.6        3.       6.5      120.       77.       43.
        LOG MEAN      0.34      0.16      0.415     0.255       0.6        3.       5.7      110.       64.       40.
70/ 9/18
**************************************************************************************************************
                     01045     01046      01055     01056     31501     31616
 DATE  PARAMETER     IRON      IRON     MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                TOTAL    FE.DISS       MN     MN.DISS  IMEDENDO  MF-C44.5
  TO                 UG/L      UG/L       UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER          10        10         10        10         8         9
        MAXIMUM     15500.      260.      360.0     100.0    40000.     3700.
        MINIMUM      1000.      100.      100.0      20.0     4400.      460.
        MEAN         4950.      165.      205.0      53.0    19550.     2159.
        LOG MEAN     3587.      156.      192.3      48.9    15595.     1779.
70/ 9/18
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     WEST POINT STUDY                                                         121939          CH-07
   . SOUTHEAST REGION
     CHATTAHOOCHEE. RIVER                                                    CHATTAHOOCHEE R AT LAG WATER INT
                                                                             13 GEORGIA
                                                                             SOUTHEAST
                                                                             CHATTAHOOCHEE
                                                                             1113S050            2111204

****************************************************************************************************************************
  DATE  PARAMETER      00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
  FROM               HSAMPLOC    WATER       DO      T ALK      LAB    CNDUCTVY    TURB     COLOR      BOD       BOD
   TO                % FROM      TEMP               CACO3       PH     AT 25C     JKSN               5 DAY     2 DAY
                     RT BANK     CENT      MG/L      MG/L       SU    MICROMHO     JU     PT-CO-U    MG/L      MG/L
 70/ 8/11
        NUMBER           10        10         9        10        10        10        10        10         3         2
        MAXIMUM          5.      25.0       8.0       16.       7.3       70.      130.       40.       1.0       1.1
        MINIMUM          5.      21.0       6.0       11.       6.9       44.       23.       10.       0.6       0.8
        MEAN             5.      23.4       7.0       14.       7.1       57.       54.       17.       0.8       0.9
        LOG MEAN         5.      23.4       6.9       13.       7.1       56.       47.       15.       0.8       0.9
 70/ 9/18
****************************************************************************************************************************
  DATE  PARAMETER      00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
  FROM                T PO4   SOLPO4-T   TOT KJEL   AMMONIA  NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
   TO                  PO4       PO4        N       NH3-N       N         CL        C       TOTAL   DISS-105  TOT NFLT
                       MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C   MG/L    MG/L
 70/ 8/11
        NUMBER           10        10        10        10        10        10        10        10        10        10
        MAXIMUM        0.45      0.18     1.030     0.720       0.8        5.       9.0      223.      174.       64.
        MINIMUM        0.25      0.07     0.380     0.170       0.4        3.       4.0       62.       30.       14.
        MEAN           0.35      0.14     0.630     0.400       0.6        4.       5.5      117.       76.       42.
        LOG MEAN       0.34      0.14     0.595     0.364       0.6        4.       5.4      107.       67.       38.
 70/ 9/18
****************************************************************************************************************************
  DATE  PARAMETER      01045     01046     01055     01056     31501     31616
  FROM                 IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
   TO                  TOTAL    FE.DISS     MN     MN.DISS   IMEDENDO  MF-C44.5
                       UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML
 70/ 8/11
        NUMBER           10        10        10        10         9         9
        MAXIMUM      12800.      260.     300.0     100.0    72000.     5700.
        MINIMUM       1200.       50.     130.0      20.0     9400.     1000.
        MEAN          4790.      168.     220.0      49.0    33767.     2867.
        LOG MEAN      3691.      153.     212.0      43.7    25999.     2321.
 70/ 9/18
****************************************************************************************************************************
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WEST POINT STUDY                                                       121940          CH-08
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                                  YELLOW JACKET CR S2098 W OF LAGR
                                                                      13 GEORGIA
                                                                      SOUTHEAST
                                                                      CHATTAHOOCHEE
                                                                      1113S050              2111204

********************************************************************************************************
                        00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE   PARAMETER     HSAMPLOC    WATER       DO      T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
 FROM                  % FROM     TEMP               CACO3       PH      AT 25C     JKSN                5 DAY     2 DAY
  TO                  RT BANK     CENT      MG/L      MG/L       SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 9/11
        NUMBER                      10        10        10        10        10        10        10         3         2
        MAXIMUM                   26.0       8.8       32.       7.3       93.      110.       40.       0.8       1.0
        MINIMUM                   21.5       6.9       22.       6.8       54.       18.       10.       0.4       0.4
        MEAN                      23.4       7.6       28.       7.2       71.       44.       21.       0.6       0.7
        LOG MEAN                  23.4       7.6       27.       7.2       70.       36.       20.       0.6       0.6
70/ 9/18
********************************************************************************************************
                        00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 DATE   PARAMETER       T PO4   SOLPO4-T  TOT KJEL  AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                    PO4       PO4        N      NH3-N        N         CL         C      TOTAL    DISS-105  TOT NFLT
  TO                    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C   MG/L    MG/L

70/ 9/11
        NUMBER              10        10        10        10        10        10        10        10        10        10
        MAXIMUM           0.32      0.23     1.810     1.120       0.5        6.       7.0      152.       87.       71.
        MINIMUM           0.04      0.02     0.200     0.120       0.2        2.       4.0       66.       15.       43.
        MEAN              0.18      0.09     0.660     0.425       0.3        3.       5.1      101.       42.       59.
        LOG MEAN          0.17      0.06     0.499     0.314       0.3        3.       5.0       98.       36.       58.
70/ 9/18
********************************************************************************************************
                        01045     01046     01055     01056     31501     31616
 DATE   PARAMETER       IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                   TOTAL    FE.DISS     MN      MN.DISS  IMEDENDO  MF-C44.5
  TO                    UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 9/11
        NUMBER              10        10        10        10         8         9
        MAXIMUM          8600.      500.     600.0     290.0    70000.     8200.
        MINIMUM          1600.      120.     270.0      60.0     7000.     2600.
        MEAN             3850.      280.     352.0     120.0    33250.     4622.
        LOG MEAN         3207.      248.     339.9     107.2    27710.     4292.
70/ 9/18
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WEST POINT STUDY                                                           121945          CH-09
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                                       YELLOW JACKET CR NE LAGRANGE
                                                                           13 GEORGIA
                                                                           SOUTHEAST
                                                                           CHATTAHOOCHEE
                                                                           1113S050             2111204

******************************************************************************************************************
                           00002     00010      00300     00410      00403     00095      00070      70515     00310     00304
 DATE  PARAMETER         HSAMPLOC    WATER       DO       T ALK       LAB     CNDUCTVY     TURB      COLOR      BOD       BOD
 FROM                    % FROM      TEMP                 CACO3       PH      AT 25C       JKSN                5 DAY     2 DAY
  TO                     RT BANK     CENT       MG/L      MG/L        SU     MICROMHO      JU       PT-CO-U    MG/L      MG/L

70/ 8/11
         NUMBER                        10         10        10         10         10        10         10         3          2
         MAXIMUM                     26.0        8.2       29.        7.4        82.       78.        40.       1.5        1.1
         MINIMUM                     21.5        6.1       20.        6.9        46.       16.        10.       0.5        0.7
         MEAN                        23.6        7.3       25.        7.2        68.       33.        19.       0.9        0.9
         LOG MEAN                    23.6        7.2       25.        7.2        67.       28.        17.       0.8        0.9
70/ 9/18
******************************************************************************************************************
                           00650     00653      00625     00610      00630     00940      00680      00500     00515     00530
 DATE  PARAMETER          T PO4    SOLPO4-T   TOT KJEL  AMMONIA    NO2&NO3   CHLORIDE   T ORG C    RESIDUE   RESIDUE   RESIDUE
 FROM                      PO4       PO4          N      NH3-N        N         CL          C        TOTAL    DISS-105  TOT NFLT
  TO                      MG/L      MG/L        MG/L      MG/L       MG/L      MG/L       MG/L       MG/L     C  MG/L    MG/L

70/ 8/11
         NUMBER              10          9        10         10         10        10         10         10        10         10
         MAXIMUM           0.21       0.08     1.320      0.750        0.4        5.        6.0       123.       75.        64.
         MINIMUM           0.07       0.02     0.150      0.060        0.1        2.        3.0        64.       13.        44.
         MEAN              0.13       0.05     0.512      0.324        0.2        3.        4.5        84.       29.        54.
         LOG MEAN          0.12       0.05     0.408      0.250        0.2        3.        4.4        82.       25.        54.
70/ 9/18
******************************************************************************************************************
                           01045     01046      01055     01056      31501     31616
 DATE  PARAMETER           IRON      IRON     MANGNESE  MANGNESE   COLIFORM   FEC COLI
 FROM                     TOTAL     FE.DISS      MN      MN.DISS   IMEDENDO   MF-C44.5
  TO                      UG/L       UG/L       UG/L      UG/L     MF/100ML   MF/100ML

70/ 9/11
         NUMBER              10         10        10          9          9          8
         MAXIMUM          7800.     4200.*     500.0      160.0     24000.     10000.
         MINIMUM          1300.       50.      220.0       70.0      1500.       150.
         MEAN             3050.      633.      300.0      117.9     13813.      2883.
         LOG MEAN         2479.      255.      290.7      113.1      9569.      1037.
70/ 9/18
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WEST POINT STUDY                                              121960-A        CH-10A
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                         CHATT R GA HWY 219 N W LAGRANGE
                                                             13 GEORGIA
                                                             SOUTHEAST
                                                             CHATTAHOOCHEE
                                                             11135050            77777777

**********************************************************************************************************************
                       00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE   PARAMETER    HSAMPLOC    WATER       DO      T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
 FROM                 % FROM     TEMP               CACO3       PH      AT 25C     JKSN                5 DAY     2 DAY
  TO                 RT BANK     CENT      MG/L      MG/L       SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER            10        10        10        10        10        10        10        10         3         2
        MAXIMUM          33.      26.0       9.0       19.       7.2       83.      120.       45.       0.8       1.0
        MINIMUM          33.      21.0       5.2       13.       7.0       46.       16.       10.       0.6       0.8
        MEAN             33.      23.7       6.8       14.       7.0       59.       55.       16.       0.7       0.9
        LOG MEAN         33.      23.6       6.8       14.       7.0       58.       45.       14.       0.7       0.9
70/ 9/18
**********************************************************************************************************************
                       00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 DATE   PARAMETER      T PO4   SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3  CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                   PO4       PO4        N       NH3-N        N        CL         C       TOTAL   DISS-105  TOT NFLT
  TO                   MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C   MG/L    MG/L

70/ 8/11
        NUMBER            10        10        10        10        10        10        10        10        10        10
        MAXIMUM         0.58      0.21     1.400     1.040       1.6        5.      10.0      195.      142.       64.
        MINIMUM         0.23      0.09     0.350     0.170       0.4        3.       4.0       52.       20.       20.
        MEAN            0.39      0.15     0.746     0.506       0.7        4.       6.4      115.       72.       44.
        LOG MEAN        0.37      0.14     0.665     0.431       0.6        4.       6.1      105.       60.       41.
70/ 9/18
**********************************************************************************************************************
                       01045     01046     01055     01056     31501     31616
 DATE   PARAMETER      IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                  TOTAL    FE.DISS      MN    MN.DISS   IMEDENDO  MF-C44.5
  TO                   UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER            10        10        10        10         9         9
        MAXIMUM       10400.      250.     380.0      70.0    64000.     5900.
        MINIMUM        1000.       40.     110.0      10.0     8000.      900.
        MEAN           4620.      137.     220.0      39.0    26750.     2978.
        LOG MEAN       3632.      120.     201.0      33.5    20747.     2310.
70/ 9/18
**********************************************************************************************************************
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WEST POINT STUDY                                                   121960-8          CH-108
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                               CHATT R GA HWY 219 N W LAGRANGE
                                                                   13 GEORGIA
                                                                   SOUTHEAST
                                                                   CHATTAHOOCHEE
                                                                   11113S050              77777777

**************************************************************************************************************
                        00002      00010      00300      00410      00403      00095      00070      70515      00310      00304
 DATE  PARAMETER      HSAMPLOC     WATER        DO       T ALK       LAB     CNDUCTVY     TURB      COLOR       BOD        BOD
 FROM                  % FROM      TEMP                  CACO3       PH       AT 25C      JKSN                 5 DAY      2 DAY
  TO                   RT BANK     CENT       MG/L       MG/L        SU      MICROMHO      JU      PT-CO-U      MG/L       MG/L

70/ 8/11
         NUMBER           10         10         10         10         10         10         10         10          2          2
         MAXIMUM         66.       26.5        7.3        18.        7.2        86.       120.        45.        0.5        1.0
         MINIMUM         66.       21.0        5.0        13.        6.9        48.        17.        10.        0.4        0.8
         MEAN            66.       23.8        6.5        14.        7.0        60.        55.        16.        0.4        0.9
         LOG MEAN        66.       23.7        6.4        14.        7.0        59.        45.        14.        0.4        0.9
70/ 9/18
**************************************************************************************************************
                        00650      00653      00625      00610      00630      00940      00680      00500      00515      00530
 DATE  PARAMETER       T PO4     SOLPO4-T   TOT KJEL   AMMONIA    NO2&NO3    CHLORIDE   T ORG C    RESIDUE    RESIDUE    RESIDUE
 FROM                   PO4        PO4         N        NH3-N        N          CL         C        TOTAL     DISS-105   TOT NFLT
  TO                    MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L     C   MG/L     MG/L

70/ 8/11
         NUMBER           10         10         10         10         10         10         10         10         10         10
         MAXIMUM        0.55       0.24      1.100      0.790        0.8         5.       10.0       196.       149.        60.
         MINIMUM        0.22       0.12      0.330      0.170        0.4         3.        4.0        57.        23.        25.
         MEAN           0.37       0.15      0.645      0.472        0.6         4.        5.8       116.        72.        44.
         LOG MEAN       0.36       0.15      0.591      0.425        0.6         4.        5.6       107.        60.        43.
70/ 9/18
**************************************************************************************************************
                        01045      01046      01055      01056      31501      31616
 DATE  PARAMETER        IRON       IRON     MANGNESE   MANGNESE   COLIFORM   FEC COLI
 FROM                   TOTAL    FE.DISS       MN      MN.DISS    IMEDENDO   MF-C44.5
  TO                    UG/L       UG/L       UG/L       UG/L     MF/100ML   MF/100ML

70/ 8/11
         NUMBER           10         10         10         10          9          8
         MAXIMUM      10900.       220.      360.0       50.0     62000.      5000.
         MINIMUM       1200.        50.      100.0       10.0      6100.       730.
         MEAN          4460.       138.      217.0       39.0     25388.      2716.
         LOG MEAN      3340.       124.      199.9       35.3     20059.      2102.
70/ 9/18
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WEST POINT STUDY                                          121980        CH-11
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                      NEW R US 27 S OF FRANKLIN
                                                          13 GEORGIA
                                                          SOUTHEAST
                                                          CHATTAHOOCHEE
                                                          1113S050             2111204

****************************************************************************************************************
DATE   PARAMETER     00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
FROM               HSAMPLOC    WATER       DO      T ALK      LAB     CNDUCTVY   TURB      COLOR      BOD       BOD
 TO                 % FROM     TEMP                CACO3      PH      AT 25C     JKSN                5 DAY     2 DAY
                    RT BANK    CENT      MG/L      MG/L       SU     MICROMHO    JU      PT-CO-U    MG/L      MG/L

70/ 8/11
        NUMBER                   10        10        10        10        10        10        10         2         2
        MAXIMUM                25.0       8.3       33.       7.3      110.       57.       45.       0.5       1.0
        MINIMUM                21.5       5.6       18.       7.0       59.       10.       10.       0.2       0.9
        MEAN                   23.3       7.2       28.       7.2       84.       23.       19.       0.3       0.9
        LOG MEAN               23.2       7.2       27.       7.2       82.       20.       17.       0.3       0.9
70/ 9/18
****************************************************************************************************************
                     00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
DATE   PARAMETER     T PO4   SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
FROM                  PO4       PO4        N       NH3-N       N         CL        C       TOTAL    DISS-105  TOT NFLT
 TO                  MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C  MG/L    MG/L

70/ 8/11
        NUMBER           10        10        10        10        10        10        10        10        10        10
        MAXIMUM        0.35      0.29     0.950     0.540       0.2        4.      11.0      101.       56.       90.
        MINIMUM        0.24      0.12     0.150     0.040       0.1        2.       4.0       69.        8.       39.
        MEAN           0.30      0.19     0.474     0.254       0.1        3.       5.8       85.       22.       63.
        LOG MEAN       0.29      0.18     0.404     0.201       0.1        3.       5.5       84.       18.       61.
70/ 9/18
****************************************************************************************************************
                     01045     01046     01055     01056     31501     31616
DATE   PARAMETER      IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
FROM                 TOTAL    FE.DISS      MN     MN.DISS   IMEDENDO  MF-C44.5
 TO                   UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER           10        10        10        10         8         8
        MAXIMUM       3000.      420.     470.0     140.0    30000.     3600.
        MINIMUM        850.      150.     160.0      40.0     1200.      130.
        MEAN          1725.      272.     253.0      92.0    10438.     1086.
        LOG MEAN      1577.      257.     241.4      85.5     6964.      477.
70/ 9/18
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WEST POINT STUDY                                              121992-A        CH-12A
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                          CHATT R AT US 27 FRANKLIN
                                                              13 GEORGIA
                                                              SOUTHEAST
                                                              CHATTAHOOCHEE
                                                              11135050             77777777

*************************************************************************************************************
                      00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE   PARAMETER   HSAMPLOC    WATER      DO       T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
 FROM               % FROM      TEMP               CACO3       PH      AT 25C     JKSN               5 DAY     2 DAY
  TO                RT BANK     CENT      MG/L      MG/L       SU     MICROMHO     JU      PT-CO-U     MG/L      MG/L
70/ 8/11
         NUMBER          10        10        10        10        10        10        10        10         3         2
         MAXIMUM        33.      27.0       8.4       23.       7.2       92.       72.       30.       2.1       1.4
         MINIMUM        33.      21.0       3.4       12.       6.9       46.       15.       10.       0.5       0.7
         MEAN           33.      23.9       6.1       16.       7.0       64.       37.       15.       1.5       1.0
         LOG MEAN       33.      23.9       5.9       15.       7.0       63.       33.       14.       1.3       1.0
70/ 9/18
*************************************************************************************************************
                      00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 DATE   PARAMETER     T PO4   SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                  PO4       PO4        N      NH3-N        N         CL        C       TOTAL    DISS-105  TOT NFLT
  TO                  MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L    C  MG/L     MG/L
70/ 8/11
         NUMBER          10        10        10        10        10        10        10        10        10        10
         MAXIMUM       0.76      0.38     1.720     1.700       0.8        6.      11.0      172.      130.       55.
         MINIMUM       0.23      0.13     0.300     0.200       0.4        3.       3.0       53.       16.       26.
         MEAN          0.39      0.18     0.823     0.631       0.5        4.       6.6      100.       55.       45.
         LOG MEAN      0.36      0.17     0.710     0.511       0.5        4.       6.1       95.       47.       44.
70/ 9/18
*************************************************************************************************************
                      01045     01046     01055     01056     31501     31616
 DATE   PARAMETER     IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                 TOTAL   FE.DISS      MN     MN.DISS   IMEDENDO  MF-C44.5
  TO                  UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML
70/ 8/11
         NUMBER          10        10        10        10         8         8
         MAXIMUM      8000.      220.     380.0      60.0   130000.    23000.
         MINIMUM      1000.       80.      70.0      10.0     5700.      900.
         MEAN         2560.      142.     184.0      39.0    38338.     6225.
         LOG MEAN     2135.      132.     163.2      35.8    24020.     2918.
70/ 9/18
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WEST POINT STUDY                                             121992-8       CH-12B
SOUTHEAST REGION
CHATTAHOOCHEE. RIVER                                         CHATT R AT US 27 FRANKLIN
                                                             13 GEORGIA
                                                             SOUTHEAST
                                                             CHATTAHOOCHEE
                                                             1113S050            77777777

*****************************************************************************************************************
 DATE  PARAMETER      00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 FROM               HSAMPLOC   WATER       DO      T ALK      LAB     CNDUCTVY    TURB     COLOR      BOD       BOD
  TO                 % FROM    TEMP                CACO3      PH      AT 25C     JKSN               5 DAY     2 DAY
                     RT BANK   CENT       MG/L      MG/L      SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER          10        10        10        10        10        10        10        10         3         2
        MAXIMUM        66.      27.0       8.3       22.       7.1       82.       80.       30.       2.8       1.4
        MINIMUM        66.      21.0       3.7       13.       6.9       50.       15.       10.       1.0       0.1
        MEAN           66.      23.8       6.2       16.       7.0       60.       36.       15.       2.0       0.7
        LOG MEAN       66.      23.8       6.0       16.       7.0       60.       31.       13.       1.8       0.4
70/ 9/18
*****************************************************************************************************************
 DATE  PARAMETER      00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 FROM                T PO4   SOLPO4-T  TOT KJEL  AMMONIA   NO2&NO3   CHLORIDE T ORG C   RESIDUE   RESIDUE   RESIDUE
  TO                  PO4       PO4        N       NH3-N       N         CL        C       TOTAL   DISS-105  TOT NFLT
                      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L   C   MG/L    MG/L

70/ 8/11
        NUMBER          10        10        10        10        10        10        10        10        10        10
        MAXIMUM       0.69      0.38     1.860     1.500       0.8        6.       8.0      167.      117.       61.
        MINIMUM       0.23      0.13     0.260     0.010       0.4        3.       3.0       47.       16.       31.
        MEAN          0.36      0.19     0.669     0.460       0.5        4.       4.9       97.       50.       47.
        LOG MEAN      0.34      0.17     0.571     0.290       0.5        4.       4.6       91.       43.       46.
70/ 9/18
*****************************************************************************************************************
 DATE  PARAMETER      01045     01046     01055     01056     31501     31616
 FROM                 IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
  TO                  TOTAL   FE,DISS      MN     MN,DISS   IMEDENDO  MF-C44.5
                      UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER          10        10        10        10         8         9
        MAXIMUM      7100.      200.     370.0      60.0   140000.    23000.
        MINIMUM      1100.       60.      70.0      10.0     5300.      850.
        MEAN         2700.      138.     181.0      38.0    42650.     6439.
        LOG MEAN     2285.      128.     161.6      32.7    24438.     3482.
70/ 9/18
*****************************************************************************************************************
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WEST POINT STUDY                                                       121915        CH-13
SOUTHEAST REGION
CHATTAHOOCHEE, RIVER                                                   WEHADKEE CR HWY 238 SE LAGRANGE
                                                                       13 GEORGIA
                                                                       SOUTHEAST
                                                                       CHATTAHOOCHEE
                                                                       1113S050          2111204

*****************************************************************************************************************
                       00002     00010     00300     00410     00403     00095     00070     70515     00310     00304
 DATE   PARAMETER    HSAMPLOC    WATER       DO      T ALK      LAB     CNDUCTVY   TURB      COLOR      BOD       BOD
 FROM                 % FROM     TEMP               CACO3       PH      AT 25C     JKSN                5 DAY     2 DAY
  TO                 RT BANK     CENT      MG/L      MG/L       SU     MICROMHO     JU     PT-CO-U     MG/L      MG/L

70/ 8/11
        NUMBER                     10        10        10        10        10        10        10         3         2
        MAXIMUM                  25.0       8.3       36.       7.3       71.       57.       40.       0.6       1.4
        MINIMUM                  22.0       7.4       18.       6.8       46.       18.       10.       0.4       0.2
        MEAN                     23.4       7.8       23.       7.1       58.       29.       24.       0.5       0.8
        LOG MEAN                 23.4       7.8       23.       7.1       57.       27.       22.       0.5       0.5
70/ 9/18
*****************************************************************************************************************
                       00650     00653     00625     00610     00630     00940     00680     00500     00515     00530
 DATE   PARAMETER     T PO4    SOLPO4-T  TOT KJEL   AMMONIA   NO2&NO3   CHLORIDE  T ORG C   RESIDUE   RESIDUE   RESIDUE
 FROM                  PO4       PO4        N       NH3-N       N         CL        C       TOTAL    DISS-105  TOT NFLT
  TO                  MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L     C  MG/L     MG/L

70/ 8/11
        NUMBER           10         9        10        10        10        10        10        10        10        10
        MAXIMUM        0.04      0.20     1.040     0.540       0.2        3.       6.0       96.       44.       65.
        MINIMUM        0.01      0.00     0.120     0.040       0.1        2.       3.0       56.        6.       35.
        MEAN           0.02      0.03     0.289     0.210       0.2        2.       3.9       71.       20.       52.
        LOG MEAN       0.02      0.01     0.225     0.151       0.2        2.       3.8       71.       17.       51.
70/ 9/18
*****************************************************************************************************************
                       01045     01046     01055     01056     31501     31616
 DATE   PARAMETER      IRON      IRON    MANGNESE  MANGNESE  COLIFORM  FEC COLI
 FROM                 TOTAL    FE,DISS      MN     MN,DISS   IMEDENDO  MF-C44.5
  TO                   UG/L      UG/L      UG/L      UG/L    MF/100ML  MF/100ML

70/ 8/11
        NUMBER           10         9        10         9         8         8
        MAXIMUM       5300.      550.     420.0     300.0     5000.      920.
        MINIMUM       1900.      100.     270.0      50.0     1500.       85.
        MEAN          2730.      346.     324.0     178.9     3313.      253.
        LOG MEAN      2579.      314.     320.4     157.0     3074.      180.
70/ 9/18
*****************************************************************************************************************
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APPENDIX F

Statistical Summary of Water Quality Data
Chattahoochee River Basin
February 1971

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WEST POINT STUDY
CHATTAHOOCHEE RIVER                                              121910-A       CH-01A
PERIOD OF RECORD
SCHNEIDER                                                        CHATTA R WEST POINT ABOVE US29
                                                                    GEORGIA
                                                                 SOUTHEAST
                                                                 CHATTAHOOCHEE
                                                                 1113S050           2111204

******************************************************************************************************************
 DATE   PARAMETER     00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 FROM               HSAMPLOC    WATER      TURB    CNDUCTVY     DO        BOD       BOD       BOD       LAB     T ALK
  TO                 % FROM     TEMP       JKSN     AT 25C               2 DAY     3 DAY     5 DAY      PH     CACO3
                    RT BANK     CENT        JU     MICROMHO    MG/L      MG/L      MG/L      MG/L       SU      MG/L
71/ 2/17
        NUMBER             8         8         8         8         7         2                   3         8         8
        MAXIMUM         33.0      15.0      210.       67.      10.1       3.0                 1.9       7.2       17.
        MINIMUM         33.0      10.0       18.       35.       7.5       1.3                 1.3       6.4       12.
        MEAN            33.0      12.3       90.       53.       8.7       2.1                 1.6       6.8       15.
        LOG MEAN        33.0      12.2       57.       52.       8.6       2.0                 1.6       6.8       15.
71/ 2/25
******************************************************************************************************************
 DATE   PARAMETER     00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 FROM               RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL  NO2&NO3    T PO4   SOLPO4-T  T ORG C   CHLORIDE
  TO                 TOTAL    DISS-105  TOT NFLT   NH3-N        N         N        PO4       PO4        C        CL
                     MG/L     C   MG/L    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
        NUMBER             8         8         8         8         8         8         8         8         8         8
        MAXIMUM         480.      441.       77.     0.540     1.920      0.57      0.70      0.11      11.0        8.
        MINIMUM          72.       15.       39.     0.120     0.520      0.33      0.17      0.05       1.0        4.
        MEAN            211.      155.       56.     0.299     0.819      0.43      0.36      0.08       5.3        6.
        LOG MEAN        159.       69.       55.     0.275     0.740      0.42      0.32      0.07       3.6        6.
71/ 2/25
******************************************************************************************************************
 DATE   PARAMETER     01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 FROM                 IRON      IRON    MANGNESE  MANGNESE  TOT COLI  FEC COLI   COLOR      AIR     STREAM      DO
  TO                 TOTAL    FE,DISS      MN     MN,DISS   MFIMENDO  MFM-FCBR              TEMP      FLOW     SATUR
                      UG/L      UG/L      UG/L      UG/L    /100ML    /100ML    PT-CO-U     CENT    CUFT/SEC  PERCENT
71/ 2/17
        NUMBER             8         8         8         8         8         8         8
        MAXIMUM       53000.      300.     600.0     100.0   350000.    11000.       50.
        MINIMUM        1300.      150.      70.0      20.0     5400.      150.       10.
        MEAN          12550.      235.     271.3      61.3   113525.     4110.       26.
        LOG MEAN       5108.      229.     191.1      54.4    45911.     2073.       23.
71/ 2/25
******************************************************************************************************************
```

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WEST POINT STUDY                                                              121910-B      CH-018
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                             CHATTA R WEST POINT ABOVE US29
SCHNEIDER                                                                    13 GEORGIA
                                                                             SOUTHEAST
                                                                             CHATTAHOOCHEE
                                                                             1113S050          2111204

********************************************************************************************************************************
                            00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 DATE  PARAMETER          HSAMPLOC    WATER      TURB   CNDUCTVY      DO       BOD       BOD       BOD       LAB      T ALK
 FROM                      % FROM     TEMP      JKSN    AT 25C                2 DAY     3 DAY     5 DAY      PH      CACO3
  TO                      RT BANK     CENT       JU    MICROMHO    MG/L      MG/L      MG/L      MG/L       SU       MG/L
71/ 2/17
          NUMBER                8         8         8         8         8         3                   4         8         8
          MAXIMUM            66.0      15.0      180.       69.      10.5       3.3                 2.0       7.2       16.
          MINIMUM            66.0      10.0       20.       34.       7.3       2.0                 1.4       6.6       12.
          MEAN               66.0      12.1       84.       51.       9.1       2.5                 1.8       6.8       14.
          LOG MEAN           66.0      12.0       55.       49.       9.0       2.5                 1.8       6.8       14.
71/ 2/25
********************************************************************************************************************************
                            00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 DATE  PARAMETER          RESIDUE   RESIDUE   RESIDUE   AMMONIA  TOT KJEL  NO2&NO3     T PO4  SOLPO4-T  T ORG C   CHLORIDE
 FROM                       TOTAL  DISS-105  TOT NFLT    NH3-N        N         N       PO4       PO4        C        CL
  TO                         MG/L  C   MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
          NUMBER                8         8         8         8         8         8         8         8         8         8
          MAXIMUM            427.      363.       64.     0.500     0.940      0.53      0.63      0.10      12.0        8.
          MINIMUM             61.       13.       33.     0.100     0.610      0.27      0.15      0.04       1.0        5.
          MEAN               181.      132.       54.     0.271     0.754      0.39      0.30      0.07       5.0        6.
          LOG MEAN           142.       66.       53.     0.246     0.747      0.38      0.27      0.07       3.6        6.
71/ 2/25
********************************************************************************************************************************
                            01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 DATE  PARAMETER             IRON      IRON  MANGNESE  MANGNESE  TOT COLI  FEC COLI     COLOR       AIR    STREAM        DO
 FROM                       TOTAL  FE,DISS        MN   MN,DISS  MFIMENDO  MFM-FCBR                TEMP      FLOW     SATUR
  TO                         UG/L      UG/L      UG/L      UG/L    /100ML    /100ML   PT-CO-U      CENT  CUFT/SEC   PERCENT
71/ 2/17
          NUMBER                8         6         8         8         8         8         8
          MAXIMUM          27000.      280.     500.0     170.0   320000.    13000.       45.
          MINIMUM           1300.      180.      80.0      40.0     4600.      480.       10.
          MEAN              8725.      239.     263.8      77.5    94100.     4160.       26.
          LOG MEAN          4519.      237.     203.7      70.3    37548.     2044.       23.
71/ 2/25
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WEST POINT STUDY                                                  121911-A"       CH-02A
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                CHATTAHOOCHEE R AT HARDLEY CR MO
SCHNEIDER                                                          GEORGIA
                                                                SOUTHEAST
                                                                CHATTAHOOCHEE
                                                                1113S050              2111204

****************************************************************************************************************************
 DATE  PARAMETER     00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 FROM              HSAMPLOC    WATER      TURB    CNDUCTVY     DO        BOD       BOD       BOD       LAB      T ALK
  TO                % FROM     TEMP       JKSN     AT 25C              2 DAY     3 DAY     5 DAY       PH      CACO3
                   RT BANK     CENT        JU     MICROMHO    MG/L      MG/L      MG/L      MG/L       SU       MG/L

71/ 2/17
       NUMBER            4         4         4         4         4                             4         4         4
       MAXIMUM        33.0      13.0       23.       60.      11.2                           2.7       7.2       18.
       MINIMUM        33.0      11.0       15.       58.       9.1                           1.6       6.7       16.
       MEAN           33.0      12.0       20.       59.      10.3                           2.2       6.9       17.
       LOG MEAN       33.0      12.0       19.       59.      10.3                           2.2       6.9       16.
71/ 2/20
****************************************************************************************************************************
 DATE  PARAMETER     00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 FROM              RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL  NO2&NO3    T PO4   SOLPO4-T  T ORG C   CHLORIDE
  TO                 TOTAL   DISS-105  TOT NFLT   NH3-N        N         N       PO4       PO4        C         CL
                      MG/L   C   MG/L     MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L

71/ 2/17
       NUMBER            4         4         4         4         4         4         4         4         4         4
       MAXIMUM         74.       22.       62.     0.230     0.530      0.54      0.24      0.10       3.0        5.
       MINIMUM         65.        9.       49.     0.140     0.390      0.48      0.19      0.08       1.0        4.
       MEAN            70.       15.       56.     0.202     0.460      0.52      0.21      0.09       2.0        5.
       LOG MEAN        70.       14.       56.     0.199     0.456      0.52      0.21      0.09       1.9        4.
71/ 2/20
****************************************************************************************************************************
 DATE  PARAMETER     01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 FROM                 IRON      IRON   MANGNESE  MANGNESE  TOT COLI  FEC COLI    COLOR       AIR    STREAM        DO
  TO                 TOTAL   FE,DISS       MN    MN,DISS   MFIMENDO  MFM-FCBR               TEMP      FLOW     SATUR
                      UG/L      UG/L      UG/L      UG/L    /100ML    /100ML   PT-CO-U      CENT  CUFT/SEC   PERCENT

71/ 2/17
       NUMBER            4         4         4         4         4         4         4
       MAXIMUM       1500.      270.      80.0      50.0    35000.     6700.       20.
       MINIMUM       1400.      220.      70.0      30.0     4200.      230.       15.
       MEAN          1450.      248.      77.5      42.5    17050.     2115.       16.
       LOG MEAN      1449.      247.      77.4      41.6    13255.      963.       16.
71/ 2/20
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WEST POINT STUDY                                                    121911-8      CH-028
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                  CHATTAHOOCHEE R AT HARDLEY CR MO
SCHNEIDER                                                         13 GEORGIA
                                                                  SOUTHEAST
                                                                  CHATTAHOOCHEE
                                                                  1113S050           2111204

************************************************************************************************************************
                     00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 DATE  PARAMETER   HSAMPLOC    WATER     TURB    CNDUCTVY     DO       BOD       BOD       BOD       LAB      T ALK
 FROM               % FROM     TEMP      JKSN     AT 25C              2 DAY     3 DAY     5 DAY      PH      CACO3
  TO               RT BANK     CENT       JU     MICROMHO    MG/L     MG/L      MG/L      MG/L       SU       MG/L

71/ 2/17
        NUMBER            4         4         4         4         4                             4         4         4
        MAXIMUM        66.0      13.0       24.       59.      11.1                           2.6       7.1       17.
        MINIMUM        66.0      11.0       12.       54.       9.2                           1.6       6.7       16.
        MEAN           66.0      12.0       19.       57.      10.3                           2.1       6.9       17.
        LOG MEAN       66.0      12.0       18.       57.      10.3                           2.0       6.9       16.
71/ 2/20
************************************************************************************************************************
                     00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 DATE  PARAMETER    RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL  NO2&NO3    T PO4   SOLPO4-T  T ORG C  CHLORIDE
 FROM                TOTAL    DISS-105  TOT NFLT   NH3-N       N         N        PO4       PO4        C         CL
  TO                 MG/L     C   MG/L    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L

71/ 2/17
        NUMBER            4         4         4         4         4         4         4         4         4         4
        MAXIMUM         73.       15.       62.     0.320     0.440      0.53      0.22      0.13       3.0        5.
        MINIMUM         64.       11.       51.     0.120     0.320      0.47      0.16      0.07       1.0        4.
        MEAN            70.       13.       57.     0.222     0.402      0.51      0.19      0.10       1.8        5.
        LOG MEAN        70.       13.       57.     0.210     0.399      0.51      0.19      0.10       1.6        4.
71/ 2/20
************************************************************************************************************************
                     01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 DATE  PARAMETER     IRON      IRON    MANGNESE  MANGNESE  TOT COLI  FEC COLI   COLOR      AIR     STREAM       DO
 FROM                TOTAL    FE,DISS     MN     MN,DISS   MFIMENDO  MFM-FCBR              TEMP      FLOW      SATUR
  TO                 UG/L      UG/L      UG/L      UG/L    /100ML    /100ML    PT-CO-U     CENT    CUFT/SEC   PERCENT

71/ 2/17
        NUMBER            4         4         4         4         4         4         4
        MAXIMUM       1500.      300.      90.0      60.0    30000.      970.       20.
        MINIMUM       1500.      230.      70.0      30.0     3600.      240.       10.
        MEAN          1500.      275.      80.0      47.5    14900.      623.       15.
        LOG MEAN      1500.      274.      79.7      46.1    11465.      555.       15.
71/ 2/20
************************************************************************************************************************
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WEST POINT STUDY                                                    121913-A          CH-03A
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                   CHATTAHOOCHEE R AT MAPLE CR. MO.
SCHNEIDER                                                          13 GEORGIA
                                                                   SOUTHEAST
                                                                   CHATTAHOOCHEE
                                                                   1113S050              2111204

*************************************************************************************************************
                           00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 DATE   PARAMETER        HSAMPLOC    WATER     TURB    CNDUCTVY     DO        BOD       BOD       BOD       LAB      T ALK
 FROM                     % FROM     TEMP      JKSN     AT 25C               2 DAY     3 DAY     5 DAY      PH      CACO3
  TO                      RT BANK    CENT       JU     MICROMHO    MG/L      MG/L      MG/L      MG/L       SU       MG/L

71/ 2/17
        NUMBER                 4         4         4         4         4                             4         4         4
        MAXIMUM             33.0      13.0       23.       60.      10.6                           2.3       7.0       18.
        MINIMUM             33.0      11.0       14.       56.       9.0                           1.7       6.7       15.
        MEAN                33.0      12.0       19.       58.       9.9                           2.0       6.9       17.
        LOG MEAN            33.0      12.0       19.       57.       9.9                           2.0       6.9       17.
71/ 2/20
*************************************************************************************************************
                           00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 DATE   PARAMETER        RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL  NO2&NO3    T PO4   SOLPO4-T  T ORG C   CHLORIDE
 FROM                     TOTAL    DISS-105  TOT NFLT   NH3-N       N         N        PO4       PO4        C         CL
  TO                       MG/L    C   MG/L    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L

71/ 2/17
        NUMBER                 4         4         4         4         4         4         4         4         4         4
        MAXIMUM              74.       17.       63.     0.240     0.500      0.57      0.24      0.13       3.0        5.
        MINIMUM              66.       11.       50.     0.130     0.380      0.49      0.19      0.07       1.0        4.
        MEAN                 70.       14.       56.     0.210     0.445      0.53      0.21      0.10       1.8        5.
        LOG MEAN             70.       13.       56.     0.204     0.443      0.53      0.21      0.10       1.6        4.
71/ 2/20
*************************************************************************************************************
                           01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 DATE   PARAMETER          IRON      IRON    MANGNESE  MANGNESE  TOT COLI  FEC COLI    COLOR      AIR     STREAM       DO
 FROM                     TOTAL    FE.DISS      MN     MN.DISS   MFIMENDO  MFM-FCBR              TEMP      FLOW      SATUR
  TO                       UG/L      UG/L      UG/L      UG/L     /100ML    /100ML   PT-CO-U     CENT    CUFT/SEC   PERCENT

71/ 2/17
        NUMBER                 4         4         4         4         4         4         4
        MAXIMUM            1700.      300.      80.0      70.0    32000.     1100.       20.
        MINIMUM            1600.      200.      70.0      50.0     5600.      280.       15.
        MEAN               1625.      258.      75.0      60.0    16900.      703.       16.
        LOG MEAN           1624.      255.      74.8      59.2    14107.      626.       16.
71/ 2/20
*************************************************************************************************************
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WEST POINT STUDY                                                          121913-B       CH-038
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                         CHATTAHOOCHEE R AT MAPLE CR. MO.
SCHNEIDER                                                                13 GEORGIA
                                                                         SOUTHEAST
                                                                         CHATTAHOOCHEE
                                                                         1113S050          2111204

*****************************************************************************************************************************
                      00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 DATE   PARAMETER    HSAMPLOC    WATER       TURB     CNDUCTVY     DO         BOD        BOD        BOD        LAB       T ALK
 FROM                 % FROM     TEMP        JKSN     AT 25C                 2 DAY      3 DAY      5 DAY       PH       CACO3
  TO                 RT BANK     CENT        JU      MICROMHO    MG/L        MG/L       MG/L       MG/L        SU        MG/L

71/ 2/17
        NUMBER            4          4          4          4          4                                4          4          4
        MAXIMUM        66.0       13.0        23.        57.       10.6                              2.3        7.1        17.
        MINIMUM        66.0       11.0        18.        52.        9.3                              1.9        6.8        13.
        MEAN           66.0       12.0        20.        56.       10.2                              2.0        6.9        16.
        LOG MEAN       66.0       12.0        20.        55.       10.2                              2.0        6.9        16.
71/ 2/20
*****************************************************************************************************************************
                      00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 DATE   PARAMETER    RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE
 FROM                 TOTAL     DISS-105   TOT NFLT    NH3-N        N          N         PO4        PO4         C          CL
  TO                  MG/L      C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L

71/ 2/17
        NUMBER            4          4          4          4          4          4          4          4          4          4
        MAXIMUM         69.        17.        57.      0.230      0.440       0.56       0.23       0.11        2.0         5.
        MINIMUM         61.        10.        47.      0.120      0.300       0.48       0.15       0.07        1.0         4.
        MEAN            66.        13.        53.      0.190      0.365       0.52       0.20       0.09        1.5         5.
        LOG MEAN        66.        13.        53.      0.185      0.362       0.52       0.20       0.09        1.4         4.
71/ 2/20
*****************************************************************************************************************************
                      01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 DATE   PARAMETER      IRON       IRON    MANGNESE   MANGNESE   TOT COLI   FEC COLI    COLOR       AIR      STREAM        DO
 FROM                 TOTAL     FE,DISS      MN      MN,DISS    MFIMENDO   MFM-FCBR               TEMP       FLOW      SATUR
  TO                  UG/L       UG/L       UG/L       UG/L      /100ML     /100ML    PT-CO-U     CENT     CUFT/SEC   PERCENT

71/ 2/17
        NUMBER            4          4          4          4          5          5          4
        MAXIMUM       1700.       300.       90.0       60.0     41000.       740.        20.
        MINIMUM       1300.       230.       70.0       20.0      3600.       240.        10.
        MEAN          1475.       255.       80.0       40.0     16920.       570.        15.
        LOG MEAN      1468.       254.       79.7       36.6     12826.       533.        15.
71/ 2/20
*****************************************************************************************************************************
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WEST POINT STUDY
CHATTAHOOCHEE RIVER                                                                  121918       CH-04
PERIOD OF RECORD
SCHNEIDER                                                                          WEHADKEE CR HWY 244 W LAGRANGE
                                                                                   13 GEORGIA
                                                                                   SOUTHEAST
                                                                                   CHATTAHOOCHEE
                                                                                   1113S050             2111204

**********************************************************************************************************************
 DATE  PARAMETER      00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 FROM               HSAMPLOC     WATER      TURB     CNDUCTVY      DO         BOD        BOD        BOD        LAB       T ALK
  TO                 % FROM      TEMP       JKSN      AT 25C                 2 DAY      3 DAY      5 DAY       PH       CACO3
                     RT BANK     CENT        JU      MICROMHO     MG/L       MG/L       MG/L       MG/L        SU        MG/L
71/ 2/17
        NUMBER                      8          8          8          7          3                     3          8          8
        MAXIMUM                  15.0        80.        42.       10.8        0.9                   1.6        7.2        17.
        MINIMUM                   8.0        13.        26.        9.0        0.3                   0.4        6.6         9.
        MEAN                     11.9        37.        33.       10.1        0.6                   1.1        6.9        13.
        LOG MEAN                 11.7        29.        33.       10.1        0.6                   0.9        6.9        13.
71/ 2/25
**********************************************************************************************************************
 DATE  PARAMETER      00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 FROM               RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE
  TO                 TOTAL     DISS-105   TOT NFLT    NH3-N         N          N         PO4        PO4         C          CL
                      MG/L     C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L
71/ 2/17
        NUMBER              8          8          8          8          8          8          8          8          8          8
        MAXIMUM          136.        81.        55.      0.340      0.700       0.20       0.10       0.05        8.0         7.
        MINIMUM           43.         2.        31.      0.040      0.110       0.11       0.02       0.01        1.0         3.
        MEAN              76.        30.        46.      0.161      0.440       0.16       0.05       0.02        3.0         4.
        LOG MEAN          70.        17.        46.      0.134      0.378       0.16       0.04       0.02        2.2         4.
71/ 2/25
**********************************************************************************************************************
 DATE  PARAMETER      01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 FROM                 IRON       IRON     MANGNESE   MANGNESE   TOT COLI   FEC COLI    COLOR        AIR      STREAM        DO
  TO                 TOTAL     FE,DISS       MN      MN,DISS   MFIMENDO   MFM-FCBR                 TEMP       FLOW       SATUR
                      UG/L       UG/L       UG/L       UG/L     /100ML     /100ML    PT-CO-U       CENT    CUFT/SEC    PERCENT
71/ 2/17
        NUMBER              8          8          8          8          8          8          8
        MAXIMUM         6100.       400.      300.0      170.0      4800.      2600.        50.
        MINIMUM         1000.       180.      150.0       80.0       170.        40.        10.
        MEAN            2688.       264.      221.3      131.3      1726.       764.        26.
        LOG MEAN        2166.       257.      215.0      126.3       826.       239.        23.
71/ 2/25
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WEST POINT STUDY                                                     121920-A        CH-05A
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                   CHATTAHOOCHEE R GA 236 W OF LAGR
SCHNEIDER                                                          13 GEORGIA
                                                                   SOUTHEAST
                                                                   CHATTAHOOCHEE
                                                                   11135050              2111204

************************************************************************************************************************
 DATE  PARAMETER        00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 FROM                 HSAMPLOC    WATER     TURB    CNDUCTVY      DO       BOD       BOD       BOD       LAB      T ALK
  TO                   % FROM     TEMP      JKSN     AT 25C             2 DAY     3 DAY     5 DAY       PH      CACO3
                       RT BANK    CENT       JU     MICROMHO     MG/L     MG/L      MG/L      MG/L       SU       MG/L
71/ 2/17
         NUMBER              8         8         8         8         8         3                   4         8         8
         MAXIMUM          33.0      15.0      180.       90.      10.4       3.5                 2.5       7.1       18.
         MINIMUM          33.0      10.0       21.       35.       6.6       1.7                 1.8       6.4       13.
         MEAN             33.0      12.2       84.       59.       8.8       2.6                 2.1       6.7       16.
         LOG MEAN         33.0      12.1       59.       57.       8.7       2.5                 2.1       6.7       16.
71/ 2/25
************************************************************************************************************************
 DATE  PARAMETER        00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 FROM                 RESIDUE   RESIDUE   RESIDUE   AMMONIA  TOT KJEL   NO2&NO3    T PO4  SOLPO4-T  T ORG C  CHLORIDE
  TO                    TOTAL   DISS-105  TOT NFLT   NH3-N        N         N       PO4       PO4        C        CL
                         MG/L   C   MG/L     MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
         NUMBER              8         8         8         8         8         8         8         8         8         8
         MAXIMUM          407.      345.       71.     0.730     1.530      1.07      0.68      0.12      10.0       10.
         MINIMUM           82.       18.       43.     0.020     0.470      0.29      0.19      0.05       1.0        5.
         MEAN             199.      137.       63.     0.416     0.985      0.52      0.34      0.08       4.9        8.
         LOG MEAN         163.       70.       62.     0.279     0.897      0.48      0.31      0.08       3.6        7.
71/ 2/25
************************************************************************************************************************
 DATE  PARAMETER        01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 FROM                    IRON      IRON   MANGNESE  MANGNESE  TOT COLI  FEC COLI   COLOR       AIR    STREAM       DO
  TO                    TOTAL   FE,DISS       MN    MN,DISS  MFIMENDO  MFM-FCBR              TEMP      FLOW     SATUR
                         UG/L      UG/L      UG/L      UG/L    /100ML    /100ML   PT-CO-U      CENT  CUFT/SEC   PERCENT
71/ 2/17
         NUMBER              8         8         8         8         8         8         8
         MAXIMUM        26000.      310.     500.0     150.0   280000.     9300.       45.
         MINIMUM         1200.      170.     100.0      30.0     8400.      650.       10.
         MEAN            8788.      224.     301.3      83.8   100050.     3000.       26.
         LOG MEAN        4812.      220.     253.7      75.9    59010.     1931.       23.
71/ 2/25
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WEST POINT STUDY
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                          121920-B        CH-058
SCHNEIDER
                                                                         CHATTAHOOCHEE R GA 238 W OF LAGR
                                                                         13 GEORGIA
                                                                         SOUTHEAST
                                                                         CHATTAHOOCHEE
                                                                         1113S050           77777777

*******************************************************************************************************************
 DATE   PARAMETER      00002     00010      00070     00095      00300     00304     00305     00310     00403     00410
 FROM                HSAMPLOC    WATER      TURB     CNDUCTVY     DO        BOD       BOD       BOD       LAB      T ALK
  TO                 % FROM      TEMP       JKSN     AT 25C               2 DAY     3 DAY     5 DAY       PH      CACO3
                     RT BANK     CENT        JU      MICROMHO    MG/L      MG/L      MG/L      MG/L       SU       MG/L
71/ 2/17
         NUMBER            8         8         8          7         8         3                   4         8         8
         MAXIMUM        66.0      15.0      180.        77.      10.3       3.1                 2.6       7.1       18.
         MINIMUM        66.0      10.0       21.        35.       6.4       1.8                 2.0       6.4       12.
         MEAN           66.0      12.2       84.        54.       8.8       2.5                 2.3       6.7       15.
         LOG MEAN       66.0      12.1       57.        52.       8.7       2.4                 2.3       6.7       15.
71/ 2/25
*******************************************************************************************************************
 DATE   PARAMETER      00500     00515      00530     00610      00625     00630     00650     00653     00680     00940
 FROM                RESIDUE    RESIDUE    RESIDUE   AMMONIA   TOT KJEL   NO2&NO3    T PO4   SOLPO4-T   T ORG C  CHLORIDE
  TO                  TOTAL    DISS-105   TOT NFLT   NH3-N        N          N        PO4       PO4         C        CL
                      MG/L     C   MG/L     MG/L      MG/L       MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
         NUMBER            8         8         8          8         8         8         8         8         8         8
         MAXIMUM        451.      398.       68.      0.540     1.200      0.97      0.65      0.12       9.0        8.
         MINIMUM         74.       12.       42.      0.020     0.500      0.30      0.20      0.05       1.0        5.
         MEAN           210.      152.       57.      0.341     0.841      0.51      0.37      0.08       4.4        6.
         LOG MEAN       163.       67.       57.      0.248     0.816      0.48      0.34      0.08       3.2        6.
71/ 2/25
*******************************************************************************************************************
 DATE   PARAMETER      01045     01046      01055     01056      31501     31616     70515     00020     00060     00301
 FROM                  IRON      IRON     MANGNESE  MANGNESE   TOT COLI  FEC COLI    COLOR      AIR     STREAM      DO
  TO                  TOTAL    FE,DISS       MN     MN,DISS    MFIMENDO  MFM-FCBR              TEMP      FLOW     SATUR
                      UG/L      UG/L       UG/L      UG/L      /100ML    /100ML   PT-CO-U      CENT    CUFT/SEC  PERCENT
71/ 2/17
         NUMBER            8         8         8          8         8         8         8
         MAXIMUM      29000.      350.     530.0      140.0   420000.    11000.       40.
         MINIMUM       1300.      160.      90.0       30.0     7200.      520.       10.
         MEAN         10063.      228.     278.8       81.3   117025.     3378.       26.
         LOG MEAN      4942.      221.     210.4       73.4    56641.     2036.       23.
71/ 2/25
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WEST POINT STUDY                                                  121938-A       CH-06A
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                 CHATT R GA HWY 109 W OF LAGRANGE
SCHNEIDER                                                        13 GEORGIA
                                                                 SOUTHEAST
                                                                 CHATTAHOOCHEE
                                                                 1113S050           77777777

*************************************************************************************************************************
                         00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 DATE  PARAMETER       HSAMPLOC     WATER       TURB    CNDUCTVY       DO         BOD        BOD        BOD        LAB      T ALK
 FROM                   % FROM      TEMP        JKSN     AT 25C                  2 DAY      3 DAY      5 DAY        PH      CACO3
  TO                    RT BANK     CENT         JU     MICROMHO     MG/L        MG/L       MG/L       MG/L        SU        MG/L

71/ 2/17
       NUMBER                8          8          8          8          7          3                     3          8          8
       MAXIMUM            33.0       15.0       200.        70.       11.0        2.7                   4.1        7.4        18.
       MINIMUM            33.0       10.5        20.        39.        6.1        1.2                   1.9        6.5        11.
       MEAN               33.0       12.8        90.        52.        8.7        1.7                   2.8        6.8        16.
       LOG MEAN           33.0       12.7        60.        50.        8.6        1.6                   2.7        6.8        15.
71/ 2/25
*************************************************************************************************************************
                         00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 DATE  PARAMETER       RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3      T PO4   SOLPO4-T   T ORG C   CHLORIDE
 FROM                    TOTAL    DISS-105   TOT NFLT     NH3-N         N          N        PO4        PO4          C         CL
  TO                      MG/L    C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L

71/ 2/17
       NUMBER                8          8          8          8          8          8          8          8          8          8
       MAXIMUM            570.       500.        70.      0.440      0.980       0.52       0.67       0.12       10.0         7.
       MINIMUM             60.         9.        40.      0.120      0.460       0.30       0.22       0.04        1.0         4.
       MEAN               209.       154.        54.      0.296      0.717       0.39       0.35       0.08        4.0         6.
       LOG MEAN           153.        69.        54.      0.275      0.693       0.38       0.32       0.08        2.7         6.
71/ 2/25
*************************************************************************************************************************
                         01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 DATE  PARAMETER          IRON       IRON   MANGNESE   MANGNESE   TOT COLI   FEC COLI      COLOR        AIR     STREAM         DO
 FROM                    TOTAL    FE,DISS         MN    MN,DISS   MFIMENDO   MFM-FCBR                  TEMP       FLOW      SATUR
  TO                      UG/L       UG/L       UG/L       UG/L     /100ML     /100ML    PT-CO-U       CENT   CUFT/SEC    PERCENT

71/ 2/17
       NUMBER                8          8          8          8          8          8          8
       MAXIMUM          17000.       280.      610.0      150.0    320000.     16000.        40.
       MINIMUM           1100.       180.       60.0       20.0     12000.      1300.        10.
       MEAN              6113.       224.      260.0       76.3    114250.      5263.        26.
       LOG MEAN          3872.       221.      202.9       63.4     65238.      3574.        22.
71/ 2/25
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WEST POINT STUDY                                                      121938-B        CH-06B
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                      CHATT R GA HWY 109 W OF LAGRANGE
SCHNEIDER                                                             13 GEORGIA
                                                                      SOUTHEAST
                                                                      CHATTAHOOCHEE
                                                                      11135050          77777777

***************************************************************************************************************************
                        00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 DATE   PARAMETER     HSAMPLOC    WATER     TURB     CNDUCTVY    DO        BOD       BOD       BOD       LAB      T ALK
 FROM                  % FROM     TEMP      JKSN     AT 25C              2 DAY     3 DAY     5 DAY      PH      CACO3
  TO                   RT BANK    CENT       JU      MICROMHO   MG/L     MG/L      MG/L      MG/L       SU       MG/L

71/ 2/17
        NUMBER              8         7         8         8         7         3                   3         8         8
        MAXIMUM          66.0      15.0      200.       78.       9.5       3.6                 3.7       7.2       19.
        MINIMUM          66.0      10.5       21.       40.       6.1       1.6                 1.7       6.5       12.
        MEAN             66.0      12.9       88.       55.       8.4       2.6                 2.5       6.8       16.
        LOG MEAN         66.0      12.8       60.       54.       8.3       2.5                 2.3       6.8       15.
71/ 2/25
***************************************************************************************************************************
                        00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 DATE   PARAMETER     RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL  NO2&NO3    T PO4   SOLPO4-T  T ORG C  CHLORIDE
 FROM                  TOTAL    DISS-105  TOT NFLT   NH3-N       N         N        PO4       PO4        C        CL
  TO                   MG/L     C   MG/L    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L

71/ 2/17
        NUMBER              8         8         8         8         8         8         8         8         8         8
        MAXIMUM          643.      583.       67.     0.620     1.400      0.59      0.84      0.16       9.0        8.
        MINIMUM           67.       12.       41.     0.140     0.500      0.34      0.23      0.06       1.0        4.
        MEAN             223.      169.       54.     0.375     0.876      0.45      0.40      0.10       4.3        6.
        LOG MEAN         161.       73.       53.     0.346     0.840      0.44      0.36      0.09       2.9        6.
71/ 2/25
***************************************************************************************************************************
                        01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 DATE   PARAMETER      IRON      IRON     MANGNESE  MANGNESE  TOT COLI  FEC COLI   COLOR      AIR     STREAM      DO
 FROM                  TOTAL    FE,DISS      MN     MN,DISS   MFIMENDO  MFM-FCBR              TEMP      FLOW     SATUR
  TO                   UG/L      UG/L      UG/L      UG/L     /100ML    /100ML    PT-CO-U     CENT    CUFT/SEC  PERCENT

71/ 2/17
        NUMBER              8         8         8         8         8         8         8
        MAXIMUM        48000.      300.     760.0     230.0   480000.    12000.       50.
        MINIMUM         1100.      170.      60.0      30.0    11000.      900.       10.
        MEAN           11500.      224.     277.5      91.3   163875.     4750.       26.
        LOG MEAN        4896.      219.     203.7      75.2    79466.     3259.       21.
71/ 2/25
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WEST POINT STUDY                                                        121939        CH-07
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                        CHATTAHOOCHEE R AT LAG WATER INT
SCHNEIDER                                                               13 GEORGIA
                                                                        SOUTHEAST
                                                                        CHATTAHOOCHEE
                                                                        1113S050            2111204

****************************************************************************************************************************
                       00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 DATE  PARAMETER     HSAMPLOC     WATER       TURB   CNDUCTVY         DO        BOD        BOD        BOD        LAB      T ALK
 FROM                 % FROM       TEMP       JKSN     AT 25C                 2 DAY      3 DAY      5 DAY         PH      CACO3
  TO                 RT BANK       CENT         JU   MICROMHO       MG/L       MG/L       MG/L       MG/L         SU       MG/L

71/ 2/17
        NUMBER             7          7          7          7          7          2                     4          7          7
        MAXIMUM          5.0       13.5       190.        72.       10.9        3.6                   4.9        7.1        20.
        MINIMUM          5.0       10.5        19.        40.        5.9        2.2                   2.6        6.3        12.
        MEAN             5.0       11.9        87.        55.        9.6        2.9                   3.6        6.8        16.
        LOG MEAN         5.0       11.9        56.        53.        9.4        2.8                   3.5        6.8        16.
71/ 2/25
****************************************************************************************************************************
                       00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 DATE  PARAMETER     RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3      T PO4  SOLPO4-T   T ORG C   CHLORIDE
 FROM                  TOTAL   DISS-105   TOT NFLT     NH3-N          N          N        PO4        PO4          C         CL
  TO                    MG/L   C   MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L

71/ 2/17
        NUMBER             7          7          7          7          7          7          7          7          7          7
        MAXIMUM         507.       463.        67.      0.930      1.900       0.60       0.78       0.18       11.0         7.
        MINIMUM          67.        11.        33.      0.320      0.770       0.33       0.25       0.02        1.0         4.
        MEAN            187.       134.        53.      0.623      1.304       0.47       0.42       0.09        4.7         6.
        LOG MEAN        131.        53.        52.      0.588      1.253       0.46       0.39       0.08        3.0         6.
71/ 2/25
****************************************************************************************************************************
                       01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 DATE  PARAMETER        IRON       IRON   MANGNESE   MANGNESE   TOT COLI   FEC COLI      COLOR        AIR     STREAM         DO
 FROM                  TOTAL    FE,DISS         MN    MN,DISS   MFIMENDO   MFM-FCBR                  TEMP       FLOW      SATUR
  TO                    UG/L       UG/L       UG/L       UG/L     /100ML     /100ML    PT-CO-U       CENT   CUFT/SEC    PERCENT

71/ 2/17
        NUMBER             7          7          7          7          7          7          7
        MAXIMUM       31000.       310.      660.0      150.0    310000.     13000.        45.
        MINIMUM        1100.       200.      100.0       30.0     15000.      1400.        10.
        MEAN          10086.       234.      282.9       77.1    136143.      5400.        25.
        LOG MEAN       4670.       232.      219.6       66.7     84874.      3952.        22.
71/ 2/25
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WEST POINT STUDY
CHATTAHOOCHEE RIVER                                                              121940        CH-08
PERIOD OF RECORD
SCHNEIDER                                                                        YELLOW JACKET CR S2098 W OF LAGR
                                                                                 13 GEORGIA
                                                                                 SOUTHEAST
                                                                                 CHATTAHOOCHEE
                                                                                 1113S050          2111204

*****************************************************************************************************************************
 DATE   PARAMETER      00002     00010      00070      00095      00300     00304     00305     00310     00403     00410
 FROM                HSAMPLOC    WATER      TURB     CNDUCTVY      DO        BOD       BOD       BOD       LAB      T ALK
  TO                  % FROM     TEMP       JKSN      AT 25C                2 DAY     3 DAY     5 DAY      PH      CACO3
                      RT BANK    CENT        JU      MICROMHO     MG/L      MG/L      MG/L      MG/L       SU       MG/L
71/ 2/17
        NUMBER                       7          7          7          7         3                   3         7         7
        MAXIMUM                   14.5       160.        47.       11.1       1.6                 1.1       7.0       17.
        MINIMUM                    9.5        21.        32.        4.6       0.2                 0.2       6.5       11.
        MEAN                      11.2        65.        39.        9.0       0.9                 0.8       6.7       15.
        LOG MEAN                  11.1        48.        39.        8.7       0.7                 0.6       6.7       15.
71/ 2/25
*****************************************************************************************************************************
 DATE   PARAMETER      00500     00515      00530      00610      00625     00630     00650     00653     00680     00940
 FROM                RESIDUE   RESIDUE    RESIDUE    AMMONIA   TOT KJEL  NO2&NO3     T PO4  SOLPO4-T  T ORG C   CHLORIDE
  TO                  TOTAL    DISS-105   TOT NFLT    NH3-N        N         N        PO4       PO4        C         CL
                      MG/L     C    MG/L    MG/L       MG/L       MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
        NUMBER               8          8          8          8          8         8         8         8         8         8
        MAXIMUM           287.       217.        72.      1.000      1.740      0.24      0.18      0.04       6.0        8.
        MINIMUM            58.         8.        35.      0.140      0.400      0.12      0.05      0.02       1.0        3.
        MEAN              114.        61.        54.      0.415      0.874      0.18      0.10      0.03       2.8        5.
        LOG MEAN          100.        38.        52.      0.343      0.781      0.18      0.09      0.03       2.1        5.
71/ 2/25
*****************************************************************************************************************************
 DATE   PARAMETER      01045     01046      01055      01056      31501     31616     70515     00020     00060     00301
 FROM                  IRON      IRON     MANGNESE   MANGNESE   TOT COLI  FEC COLI    COLOR      AIR     STREAM       DO
  TO                  TOTAL    FE,DISS       MN      MN,DISS   MFIMENDO  MFM-FCBR               TEMP      FLOW      SATUR
                      UG/L       UG/L       UG/L       UG/L     /100ML    /100ML   PT-CO-U      CENT   CU FT/SEC  PERCENT
71/ 2/17
        NUMBER               8          8          8          8          8         8         8
        MAXIMUM          6800.       280.      940.0       80.0     50000.    17000.       65.
        MINIMUM          1500.       190.      160.0       30.0      4000.       50.       10.
        MEAN             2513.       245.      338.8       66.3     16350.     3975.       31.
        LOG MEAN         2195.       244.      280.8       63.3     10980.      652.       26.
71/ 2/25
*****************************************************************************************************************************
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WEST POINT STUDY                                                            121945        CH-09
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                          YELLOW JACKET CR NE LAGRANGE
SCHNEIDEP                                                                 13 GEORGIA
                                                                          SOUTHEAST
                                                                          CHATTAHOOCHEE
                                                                          1113S050             2111204

*************************************************************************************************************************************
                        00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 DATE   PARAMETER     HSAMPLOC     WATER       TURB    CNDUCTVY      DO         BOD        BOD        BOD        LAB      T ALK
 FROM                  % FROM      TEMP        JKSN     AT 25C                 2 DAY      3 DAY      5 DAY       PH      CACO3
  TO                   RT BANK     CENT         JU     MICROMHO     MG/L       MG/L       MG/L       MG/L        SU       MG/L

71/ 2/17
        NUMBER                        7          7          7          7          2                     4          7          7
        MAXIMUM                    15.5       155.        42.       11.0        1.5                   1.0        7.0        17.
        MINIMUM                     8.5        18.        27.        8.5        0.9                   0.4        6.3        12.
        MEAN                       12.2        57.        34.        9.4        1.2                   0.8        6.7        14.
        LOG MEAN                   12.0        41.        34.        9.4        1.2                   0.7        6.7        14.
71/ 2/25
*************************************************************************************************************************************
                        00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 DATE   PARAMETER     RESIDUE    RESIDUE    RESIDUE    AMMONIA    TOT KJEL   NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE
 FROM                  TOTAL     DISS-105   TOT NFLT    NH3-N        N          N         PO4        PO4         C         CL
  TO                    MG/L     C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L

71/ 2/17
        NUMBER             8          8          8          8          8          8          8          8          8          8
        MAXIMUM         217.       164.        57.      0.480      1.040       0.28       0.14       0.02        6.0        10.
        MINIMUM          52.         6.        34.      0.060      0.190       0.12       0.04       0.01        1.0         3.
        MEAN             96.        50.        45.      0.197      0.562       0.18       0.07       0.02        2.6         5.
        LOG MEAN         84.        29.        44.      0.156      0.480       0.18       0.06       0.02        2.1         4.
71/ 2/25
*************************************************************************************************************************************
                        01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 DATE   PARAMETER       IRON       IRON     MANGNESE   MANGNESE   TOT COLI   FEC COLI     COLOR       AIR      STREAM        DO
 FROM                  TOTAL     FE,DISS       MN      MN,DISS    MFIMENDO   MFM-FCBR                TEMP       FLOW      SATUR
  TO                    UG/L       UG/L       UG/L       UG/L      /100ML     /100ML    PT-CO-U      CENT     CUFT/SEC   PERCENT

71/ 2/17
        NUMBER             8          8          8          8          8          8          8
        MAXIMUM       11000.       280.      630.0      200.0     49000.     10000.        50.
        MINIMUM        1500.       160.      160.0       70.0       200.        20.        10.
        MEAN           3800.       231.      281.3       97.5      8369.      2066.        26.
        LOG MEAN       3022.       227.      247.2       91.7      1884.       349.        23.
71/ 2/25
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WEST POINT STUDY                                                         121960-A      CH-10A
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                        CHATT R GA HWY 219 N W LAGRANGE
SCHNEIDER                                                               13 GEORGIA
                                                                        SOUTHEAST
                                                                        CHATTAHOOCHEE
                                                                        1113S050          77777777

*************************************************************************************************************************
 DATE   PARAMETER      00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 FROM                HSAMPLOC     WATER      TURB     CNDUCTVY      DO        BOD        BOD        BOD        LAB       T ALK
  TO                 % FROM       TEMP       JKSN      AT 25C                2 DAY      3 DAY      5 DAY       PH       CACO3
                     RT BANK      CENT        JU      MICROMHO    MG/L       MG/L       MG/L       MG/L        SU        MG/L
71/ 2/17
        NUMBER             8          8          8          8          8          3                     4          8          8
        MAXIMUM         33.0       15.0       250.        75.        9.9        2.9                   3.3        6.9        18.
        MINIMUM         33.0       10.5        18.        36.        5.5        1.6                   2.0        6.4        12.
        MEAN            33.0       12.4        96.        53.        8.3        2.1                   2.6        6.7        15.
        LOG MEAN        33.0       12.4        61.        52.        8.2        2.0                   2.5        6.7        15.
71/ 2/25
*************************************************************************************************************************
 DATE   PARAMETER      00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 FROM                RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE
  TO                  TOTAL     DISS-105   TOT NFLT    NH3-N        N          N         PO4        PO4        C          CL
                      MG/L     C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L
71/ 2/17
        NUMBER             8          8          8          9          9          9          9          9          9          9
        MAXIMUM         814.       770.        65.      0.970      1.600       0.50       0.85       0.13       12.0         9.
        MINIMUM          76.        15.        33.      0.260      0.670       0.33       0.22       0.04        1.0         4.
        MEAN            247.       193.        54.      0.543      1.127       0.42       0.41       0.07        4.2         6.
        LOG MEAN        174.        84.        53.      0.499      1.084       0.41       0.38       0.07        2.7         6.
71/ 2/25
*************************************************************************************************************************
 DATE   PARAMETER      01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 FROM                  IRON       IRON     MANGNESE   MANGNESE   TOT COLI   FEC COLI    COLOR       AIR      STREAM       DO
  TO                  TOTAL     FE,DISS       MN      MN,DISS    MFIMENDO   MFM-FCBR                TEMP       FLOW      SATUR
                      UG/L       UG/L       UG/L       UG/L      /100ML     /100ML     PT-CO-U     CENT     CUFT/SEC   PERCENT
71/ 2/17
        NUMBER             9          9          9          9          8          8          8
        MAXIMUM       64000.       360.      850.0      150.0    800000.     12000.        45.
        MINIMUM        1100.       140.       90.0       30.0     25000.      1000.        10.
        MEAN          10978.       224.      276.7       64.4    193125.      4338.        27.
        LOG MEAN       3535.       218.      205.4       58.9    101298.      3329.        23.
71/ 2/25
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WEST POINT STUDY                                                   121960-B      CH-103
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                  CHATT R GA HWY 219 N W LAGRANGE
SCHNEIDER                                                         13 GEORGIA
                                                                  SOUTHEAST
                                                                  CHATTAHOOCHEE
                                                                  1113S050          77777777

*****************************************************************************************************************
                    00002     00010     00070     00095      00300      00304      00305      00310     00403      00410
 DATE  PARAMETER  HSAMPLOC    WATER     TURB    CNDUCTVY      DO        BOD        BOD        BOD       LAB      T ALK
 FROM              % FROM     TEMP      JKSN     AT 25C                2 DAY      3 DAY      5 DAY      PH       CACO3
  TO              RT BANK     CENT       JU     MICROMHO    MG/L       MG/L       MG/L       MG/L       SU       MG/L

71/ 2/17
       NUMBER            8         8         8         8          8          3                     4          8          8
       MAXIMUM        66.0      15.0      250.       71.        9.8        3.3                   5.2        7.0        19.
       MINIMUM        66.0      10.5       19.       36.        5.9        1.5                   1.0        6.4        12.
       MEAN           66.0      12.4       93.       53.        8.2        2.3                   2.9        6.7        15.
       LOG MEAN       66.0      12.4       57.       51.        8.2        2.2                   2.5        6.7        15.
71/ 2/25
*****************************************************************************************************************
                    00500     00515     00530     00610      00625      00630      00650      00653     00680      00940
 DATE  PARAMETER   RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL   NO2&NO3     T PO4    SOLPO4-T  T ORG C   CHLORIDE
 FROM               TOTAL   DISS-105  TOT NFLT   NH3-N        N          N         PO4        PO4        C         CL
  TO                MG/L    C   MG/L    MG/L      MG/L       MG/L       MG/L       MG/L       MG/L      MG/L      MG/L

71/ 2/17
       NUMBER            8         8         8         8          8          8          8          8          8          8
       MAXIMUM        926.      874.       67.     0.770      1.860       0.49       0.98       0.16       14.0         9.
       MINIMUM         73.       15.       36.     0.270      0.680       0.33       0.23       0.05        1.0         4.
       MEAN           259.      206.       55.     0.504      1.044       0.41       0.42       0.10        4.1         6.
       LOG MEAN       172.       76.       54.     0.475      0.997       0.40       0.38       0.09        2.7         6.
71/ 2/25
*****************************************************************************************************************
                    01045     01046     01055     01056      31501      31616      70515      00020     00060      00301
 DATE  PARAMETER    IRON      IRON    MANGNESE  MANGNESE   TOT COLI   FEC COLI    COLOR       AIR      STREAM       DO
 FROM               TOTAL   FE,DISS      MN     MN,DISS   MFIMENDO   MFM-FCBR                TEMP      FLOW      SATUR
  TO                UG/L      UG/L      UG/L      UG/L     /100ML     /100ML    PT-CO-U      CENT    CUFT/SEC   PERCENT

71/ 2/17
       NUMBER            8         8         8         8          8          8          8
       MAXIMUM      73000.      400.     880.0     150.0    320000.     11000.        45.
       MINIMUM       1200.      140.      80.0      30.0     28000.      2200.        10.
       MEAN         14650.      224.     281.3      65.0    102750.      5363.        28.
       LOG MEAN      5102.      213.     196.9      58.2     73572.      4467.        23.
71/ 2/25
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WEST POINT STUDY                                                         121980          CH-11
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                         NEW R US 27 S OF FRANKLIN
SCHNEIDER                                                                13 GEORGIA
                                                                         SOUTHEAST
                                                                         CHATTAHOOCHEE
                                                                         1113S050            2111204

*********************************************************************************************************************************
 DATE  PARAMETER        00002     00010      00070     00095      00300     00304     00305     00310     00403     00410
 FROM                 HSAMPLOC    WATER      TURB     CNDUCTVY     DO        BOD       BOD       BOD       LAB      T ALK
  TO                  % FROM      TEMP       JKSN     AT 25C                2 DAY     3 DAY     5 DAY      PH      CACO3
                      RT BANK     CENT        JU      MICROMHO    MG/L      MG/L      MG/L      MG/L       SU       MG/L
71/ 2/17
        NUMBER                        8          8          8         8         3                   4         8          8
        MAXIMUM                    14.5       150.        61.      11.2       1.0                 1.0       7.1        16.
        MINIMUM                     8.5        16.        27.       7.7       0.8                 0.2       6.5        10.
        MEAN                       11.2        58.        41.       9.1       0.9                 0.6       6.7        14.
        LOG MEAN                   11.1        43.        39.       9.0       0.9                 0.5       6.7        14.
71/ 2/25
*********************************************************************************************************************************
 DATE  PARAMETER        00500     00515      00530     00610      00625     00630     00650     00653     00680     00940
 FROM                 RESIDUE    RESIDUE    RESIDUE   AMMONIA   TOT KJEL   NO2&NO3    T PO4   SOLPO4-T  T ORG C  CHLORIDE
  TO                   TOTAL    DISS-105   TOT NFLT    NH3-N        N         N        PO4       PO4        C        CL
                        MG/L    C   MG/L     MG/L      MG/L       MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
        NUMBER              8          8          8          8         8         8         8         8         8          8
        MAXIMUM          360.       306.        56.      0.400     1.050      0.24      0.30      0.21       7.0         7.
        MINIMUM           58.         6.        27.      0.100     0.350      0.06      0.16      0.05       1.0         3.
        MEAN             137.        88.        48.      0.285     0.734      0.17      0.23      0.11       4.1         5.
        LOG MEAN         109.        39.        46.      0.259     0.690      0.15      0.23      0.10       3.4         5.
71/ 2/25
*********************************************************************************************************************************
 DATE  PARAMETER        01045     01046      01055     01056      31501     31616     70515     00020     00060     00301
 FROM                    IRON      IRON    MANGNESE  MANGNESE   TOT COLI  FEC COLI    COLOR      AIR     STREAM       DO
  TO                   TOTAL    FE,DISS       MN     MN,DISS    MFIMENDO  MFM-FCBR              TEMP      FLOW      SATUR
                        UG/L      UG/L       UG/L      UG/L      /100ML    /100ML   PT-CO-U     CENT    CUFT/SEC   PERCENT
71/ 2/17
        NUMBER              8          8          8          8         8         8         8
        MAXIMUM         9400.       460.      450.0       70.0    23000.    13000.       50.
        MINIMUM         1100.       180.      120.0       50.0       70.       37.       15.
        MEAN            3950.       276.      228.8       58.8     7291.     3080.       30.
        LOG MEAN        2934.       265.      203.5       58.0     2112.      606.       27.
71/ 2/25
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WEST POINT STUDY                                                       121992-A        CH-12A
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                      CHATT R AT US 27 FRANKLIN
SCHNEIDER                                                             13 GEORGIA
                                                                      SOUTHEAST
                                                                      CHATTAHOOCHEE
                                                                      1113S050          77777777

*****************************************************************************************************************************
                         00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 DATE   PARAMETER      HSAMPLOC     WATER       TURB     CNDUCTVY      DO         BOD        BOD        BOD        LAB      T ALK
 FROM                   % FROM      TEMP        JKSN      AT 25C                 2 DAY      3 DAY      5 DAY        PH      CACO3
  TO                   RT BANK      CENT         JU      MICROMHO     MG/L       MG/L       MG/L       MG/L        SU       MG/L

71/ 2/17
        NUMBER              7          7          7          7          7          2                     4          7          7
        MAXIMUM          33.0       14.0       210.        73.       10.9        3.1                   4.4        7.0        19.
        MINIMUM          33.0       11.0        19.        41.        5.9        1.3                   2.1        6.5         7.
        MEAN             33.0       12.5        82.        58.        9.1        2.2                   3.5        6.7        16.
        LOG MEAN         33.0       12.5        54.        57.        8.9        2.0                   3.4        6.7        15.
71/ 2/25
*****************************************************************************************************************************
                         00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 DATE   PARAMETER      RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3     T PO4    SOLPO4-T   T ORG C   CHLORIDE
 FROM                   TOTAL    DISS-105   TOT NFLT     NH3-N        N          N        PO4        PO4         C         CL
  TO                     MG/L    C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L

71/ 2/17
        NUMBER              8          8          8          8          8          8          8          8          8          8
        MAXIMUM          902.       821.        81.      0.960      1.900       0.50       0.90       0.16        8.0         9.
        MINIMUM           73.        10.        34.      0.280      0.780       0.30       0.24       0.05        0.0         5.
        MEAN             257.       197.        58.      0.657      1.261       0.39       0.45       0.11        4.1         6.
        LOG MEAN         175.        75.        56.      0.614      1.211       0.38       0.42       0.10        1.8         6.
71/ 2/25
*****************************************************************************************************************************
                         01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 DATE   PARAMETER        IRON       IRON    MANGNESE   MANGNESE   TOT COLI   FEC COLI     COLOR        AIR     STREAM         DO
 FROM                   TOTAL    FE,DISS        MN     MN,DISS   MFIMENDO   MFM-FCBR                  TEMP       FLOW      SATUR
  TO                     UG/L       UG/L       UG/L       UG/L     /100ML     /100ML    PT-CO-U       CENT   CUFT/SEC    PERCENT

71/ 2/17
        NUMBER              8          8          8          8          8          8          8
        MAXIMUM        49000.       360.      800.0      170.0    860000.     40000.        50.
        MINIMUM         1300.       180.       80.0       40.0     22000.      1500.        15.
        MEAN           10663.       234.      268.8       78.8    280000.     13113.        28.
        LOG MEAN        4837.       229.      201.1       71.1    152225.      8734.        25.
71/ 2/25
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WEST POINT STUDY
CHATTAHOOCHEE RIVER                                             121992-B       CH-12B
PERIOD OF RECORD
SCHNEIDER                                                   CHATT R AT US 27 FRANKLIN
                                                            13 GEORGIA
                                                            SOUTHEAST
                                                            CHATTAHOOCHEE
                                                            1113S050            77777777

****************************************************************************************************************************
 DATE   PARAMETER     00002     00010     00070     00095     00300     00304     00305     00310     00403     00410
 FROM                HSAMPLOC   WATER     TURB     CNDUCTVY    DO        BOD       BOD       BOD       LAB      T ALK
  TO                 % FROM     TEMP      JKSN     AT 25C              2 DAY     3 DAY     5 DAY       PH      CACO3
                     RT BANK    CENT       JU      MICROMHO   MG/L      MG/L      MG/L      MG/L       SU       MG/L
71/ 2/17
        NUMBER            8         8         8         8         8         3                   4         8         8
        MAXIMUM        66.0      15.0      200.       73.      11.0       3.0                 4.3       7.0       19.
        MINIMUM        66.0      11.0       18.       37.       6.1       1.2                 3.5       6.5       14.
        MEAN           66.0      12.8       86.       54.       8.7       2.0                 3.9       6.7       17.
        LOG MEAN       66.0      12.7       59.       52.       8.5       1.9                 3.9       6.7       17.
71/ 2/25
****************************************************************************************************************************
 DATE   PARAMETER     00500     00515     00530     00610     00625     00630     00650     00653     00680     00940
 FROM                RESIDUE   RESIDUE   RESIDUE   AMMONIA   TOT KJEL  NO2&NO3    T PO4    SOLPO4-T  T ORG C  CHLORIDE
  TO                  TOTAL    DISS-105  TOT NFLT   NH3-N       N         N        PO4       PO4        C         CL
                      MG/L     C   MG/L    MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L      MG/L
71/ 2/17
        NUMBER            8         8         8         8         8         8         8         8         8         8
        MAXIMUM        845.      717.      128.     0.920     1.900      0.48      0.97      0.16       9.0        9.
        MINIMUM         74.       10.       49.     0.300     0.920      0.34      0.22      0.05       1.0        5.
        MEAN           257.      189.       68.     0.627     1.216      0.40      0.46      0.10       4.1        6.
        LOG MEAN       179.       74.       65.     0.588     1.186      0.40      0.42      0.10       3.1        6.
71/ 2/25
****************************************************************************************************************************
 DATE   PARAMETER     01045     01046     01055     01056     31501     31616     70515     00020     00060     00301
 FROM                 IRON      IRON    MANGNESE  MANGNESE  TOT COLI  FEC COLI   COLOR      AIR     STREAM       DO
  TO                  TOTAL    FE,DISS     MN     MN,DISS   MFIMENDO  MFM-FCBR             TEMP      FLOW      SATUR
                      UG/L      UG/L      UG/L      UG/L     /100ML    /100ML   PT-CO-U     CENT    CUFT/SEC  PERCENT
71/ 2/17
        NUMBER            8         8         8         8         8         8         8
        MAXIMUM      63000.      270.     840.0     170.0   880000.    27000.       50.
        MINIMUM       1200.      180.      70.0      40.0    32000.     1800.       15.
        MEAN         12963.      229.     280.0      75.0   326500.    11375.       29.
        LOG MEAN      5158.      227.     211.3      67.0   176282.     7763.       25.
71/ 2/25
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-156.

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WEST POINT STUDY                                                                  121915        CH-13
CHATTAHOOCHEE RIVER
PERIOD OF RECORD                                                                  WEHADKEE CR HWY 238 SE LAGRANGE
SCHNEIDER                                                                         13 GEORGIA
                                                                                  SOUTHEAST
                                                                                  CHATTAHOOCHEE
                                                                                  11135050             2111204

**************************************************************************************************************************************
 DATE   PARAMETER      00002      00010      00070      00095      00300      00304      00305      00310      00403      00410
 FROM                HSAMPLOC     WATER      TURB     CNDUCTVY      DO        BOD        BOD        BOD        LAB       T ALK
  TO                  % FROM      TEMP       JKSN      AT 25C                2 DAY      3 DAY      5 DAY       PH       CACO3
                      RT BANK     CENT        JU      MICROMHO     MG/L      MG/L       MG/L       MG/L        SU        MG/L
71/ 2/17
        NUMBER                        7          7          7          7          3                     3          7          7
        MAXIMUM                    15.0       110.        55.       11.0        2.7                   5.7        7.0        15.
        MINIMUM                     8.0        14.        26.        8.7        0.9                   1.6        6.6        10.
        MEAN                       11.6        50.        37.       10.0        1.6                   3.0        6.8        12.
        LOG MEAN                   11.4        38.        35.        9.9        1.4                   2.5        6.8        12.
71/ 2/25
**************************************************************************************************************************************
 DATE   PARAMETER      00500      00515      00530      00610      00625      00630      00650      00653      00680      00940
 FROM                RESIDUE    RESIDUE    RESIDUE    AMMONIA   TOT KJEL   NO2&NO3     T PO4    SOLPO4-T  T ORG C   CHLORIDE
  TO                  TOTAL     DISS-105   TOT NFLT    NH3-N        N          N         PO4        PO4        C          CL
                      MG/L      C   MG/L     MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L       MG/L
71/ 2/17
        NUMBER             8          8          8          8          8          8          8          8          8          8
        MAXIMUM         154.       103.        68.      0.470      0.860       0.20       0.33       0.03        8.0         7.
        MINIMUM          49.         2.        33.      0.050      0.140       0.10       0.02       0.01        1.0         4.
        MEAN             90.        41.        48.      0.184      0.471       0.16       0.08       0.02        3.0         5.
        LOG MEAN         82.        21.        47.      0.145      0.402       0.16       0.05       0.02        2.1         5.
71/ 2/25
**************************************************************************************************************************************
 DATE   PARAMETER      01045      01046      01055      01056      31501      31616      70515      00020      00060      00301
 FROM                  IRON       IRON     MANGNESE   MANGNESE   TOT COLI   FEC COLI    COLOR       AIR      STREAM       DO
  TO                  TOTAL     FE,DISS       MN      MN,DISS    MFIMENDO   MFM-FCBR                TEMP       FLOW      SATUR
                      UG/L       UG/L       UG/L       UG/L      /100ML     /100ML    PT-CO-U      CENT     CUFT/SEC   PERCENT
71/ 2/17
        NUMBER             8          8          8          8          8          8          8
        MAXIMUM        6600.       290.     2600.0      250.0      5600.      3800.        50.
        MINIMUM        1100.       200.      150.0       80.0        80.        14.        10.
        MEAN           3225.       241.      553.8      127.5      1798.      1069.        25.
        LOG MEAN       2582.       239.      322.4      116.0       714.       262.        22.
71/ 2/25
**************************************************************************************************************************************
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APPENDIX G

Statistical Summary of Water Quality Data for a Diurnal Study at Stations 5, 6, 10 and 12 Chattahoochee River Basin September 1970

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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY
       SOUTHEAST REGION                                                  121920      CH-05
       CHATTAHOOCHEE, RIVER
                                                                     CHATTAHOOCHEE R GA 238 W OF LAGR
                                                                     13 GEORGIA
                                                                     SOUTHEAST
                                                                     CHATTAHOOCHEE
                                                                     1113S050          2111204

                          00002    00010    00410    00403    00300           00010    00410    00403    00300
 DATE    TIME DEPTH HSAMPLOC       WATER    T ALK    LAB      DO              WATER    T ALK    LAB      DO
 FROM     OF         % FROM        TEMP     CACO3    PH                       TEMP     CACO3    PH
  TO     DAY   FEET  RT BANK       CENT     MG/L     SU       MG/L            CENT     MG/L     SU       MG/L
                                   LOG      LOG      LOG      LOG
70/09/17 0700              33      26.5       20      6.8      4.7            26.5       20      6.8      4.7
70/09/17 0800              33      26.0       20      6.8      4.8            26.0       20      6.8      4.8
70/09/17 0900              33      26.0       21      6.7      4.8            26.0       21      6.7      4.8
70/09/17 1005              33      26.0       19      6.8      4.9            26.0       19      6.8      4.9
70/09/17 1100              33      26.0       19      6.8      5.0            26.0       19      6.8      5.0
70/09/17 1200              33      26.0       18      6.9      5.1            26.0       18      6.9      5.1
70/09/17 1300              33      26.0       17      6.9      5.5            26.0       17      6.9      5.5
70/09/17 1400              33      26.0       16      7.0      5.8            26.0       16      7.0      5.8
70/09/17 1500              33      26.0       15      6.9      5.8            26.0       15      6.9      5.8
70/09/17 1600              33      25.0       14      7.0      6.1            25.0       14      7.0      6.1
70/09/17 1710              33      25.5       15      7.0      6.4            25.5       15      7.0      6.4
70/09/17 1800              33      25.0       16      6.9      5.7            25.0       16      6.9      5.7
70/09/17 1900              33      25.0       15      7.0      6.4            25.0       15      7.0      6.4
00/00/00
STATION  NUMBER            13      13.0       13     13.0     13.0            13.0       13     13.0     13.0
         MAXIMUM           33      26.5       21      7.0      6.4            26.5       21      7.0      6.4
         MINIMUM           33      25.0       14      6.7      4.7            25.0       14      6.7      4.7
         MEAN              33      25.8       17      6.9      5.4            25.8       17      6.9      5.5
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                               121920        CH-05
       SOUTHEAST REGION
       CHATTAHOOCHEE, RIVER                                          CHATTAHOOCHEE R GA 238 W OF LAGR
                                                                     13 GEORGIA
                                                                     SOUTHEAST
                                                                     CHATTAHOOCHEE
                                                                     1113S050          2111204

                             00002     00010     00410     00403     00300            00010     00410     00403     00300
 DATE    TIME DEPTH HSAMPLOC   WATER     T ALK     LAR       DO               WATER     T ALK     LAR       DO
 FROM     OF          % FROM   TEMP      CACO3     PH                         TEMP      CACO3     PH
  TO     DAY   FEET   RT BANK  CENT      MG/L      SU        MG/L             CENT      MG/L      SU        MG/L
                               LOG       LOG       LOG       LOG
70/09/17 0705             66    26.5        19       6.8       4.9             26.5        19       6.8       4.9
70/09/17 0805             66    26.0        19       6.8       5.0             26.0        19       6.8       5.0
70/09/17 0905             66    26.0        19       6.7       4.6             26.0        19       6.7       4.6
70/09/17 1010             66    26.0        16       6.8       5.1             26.0        16       6.8       5.1
70/09/17 1105             66    26.0        19       6.8       5.1             26.0        19       6.8       5.1
70/09/17 1205             66    26.0        18       6.7       5.2             26.0        18       6.7       5.2
70/09/17 1305             66    26.0        16       6.8       5.7             26.0        16       6.8       5.7
70/09/17 1405             66    26.0        15       6.8       5.7             26.0        15       6.8       5.7
70/09/17 1505             66    26.0        14       6.7       6.4             26.0        14       6.7       6.4
70/09/17 1605             66    25.0        16       6.9       6.1             25.0        16       6.9       6.1
70/09/17 1705             66    25.5        15       6.9       6.6             25.5        15       6.9       6.6
70/09/17 1805             66    24.5        15       6.7       6.8             24.5        15       6.7       6.8
70/09/17 1905             66    24.5        16       6.8       6.6             24.5        16       6.8       6.6
00/00/00
STATION  NUMBER           13    13.0        13      13.0      13.0             13.0        13      13.0      13.0
         MAXIMUM          66    26.5        19       6.9       6.8             26.5        19       6.9       6.8
         MINIMUM          66    24.5        14       6.7       4.6             24.5        14       6.7       4.6
          MEAN            66    25.7        17       6.8       5.6             25.7        17       6.8       5.7
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                              121938         CH-06
       SOUTHEAST REGION
       CHATTAHOOCHEE. RIVER                                        CHATT R GA HWY 109 W OF LAGRANGE
                                                                   13 GEORGIA
                                                                   SOUTHEAST
                                                                   CHATTAHOOCHEE              GDPH 16
                                                                   11135050           2111204

                            00002       00010     00410     00403     00300               00010     00410     00403     00300
  DATE    TIME DEPTH HSAMPLOC       WATER     T ALK     LAB       DO                  WATER     T ALK     LAB       DO
  FROM     OF           % FROM       TEMP      CACO3     PH                            TEMP      CACO3     PH
   TO     DAY   FEET   RT BANK       CENT      MG/L      SU        MG/L                CENT      MG/L      SU        MG/L
                                      LOG       LOG       LOG       LOG
70/09/17 0725              33        25.0        20       6.8       5.1                25.0        20       6.8       5.1
70/09/17 0820              33        25.0        19       6.9       5.0                25.0        19       6.9       5.0
70/09/17 0920              33        24.5        16       6.9       4.8                24.5        16       6.9       4.8
70/09/17 1020              33        24.5        19       6.9       5.8                24.5        19       6.9       5.8
70/09/17 1120              33        24.5        18       6.9       6.1                24.5        18       6.9       6.1
70/09/17 1220              33        24.5        16       6.9       6.0                24.5        16       6.9       6.0
70/09/17 1320              33        24.0        16       7.0       6.5                24.0        16       7.0       6.5
70/09/17 1420              33        26.0        16       6.9       6.6                26.0        16       6.9       6.6
70/09/17 1520              33        25.0        16       7.0       6.6                25.0        16       7.0       6.6
70/09/17 1615              33        25.0        16       7.0       6.7                25.0        16       7.0       6.7
70/09/17 1730              33        24.0        15       7.0       6.6                24.0        15       7.0       6.6
70/09/17 1825              33        24.0        16       7.0       6.6                24.0        16       7.0       6.6
70/09/17 1915              33        24.0        18       7.0       6.4                24.0        18       7.0       6.4
0J/00/00
STATION  NUMBER            13        13.0        13      13.0      13.0                13.0        13      13.0      13.0
         MAXIMUM           33        26.0        20       7.0       6.7                26.0        20       7.0       6.7
         MINIMUM           33        24.0        15       6.8       4.8                24.0        15       6.8       4.8
         MEAN              33        24.6        17       6.9       6.0                24.6        17       6.9       6.1
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                                  121938        CH-06
       SOUTHEAST REGION
       CHATTAHOOCHEE, RIVER                                             CHATT R GA HWY 109 W OF LAGRANGE
                                                                        13 GEORGIA
                                                                        SOUTHEAST
                                                                        CHATTAHOOCHEE               GDPH 16
                                                                        11135050               2111204

                            00002     00010      00410      00403      00300             00010     00410      00403      00300
  DATE    TIME DEPTH HSAMPLOC   WATER      T ALK      LAB        DO                WATER     T ALK      LAB        DO
  FROM     OF          % FROM   TEMP       CACO3      PH                           TEMP      CACO3      PH
   TO     DAY   FEET  RT BANK   CENT       MG/L       SU         MG/L              CENT      MG/L       SU         MG/L
                                LOG        LOG        LOG        LOG
70/09/17 0730              66     25.0         18        6.8        4.8              25.0        18        6.8        4.8
70/09/17 0825              66     25.0         17        6.9        5.0              25.0        17        6.9        5.0
70/09/17 0925              66     24.5         16        6.8        5.3              24.5        16        6.8        5.3
70/09/17 1025              66     24.5         15        6.8        5.8              24.5        15        6.8        5.8
70/09/17 1125              66     24.5         17        6.8        5.9              24.5        17        6.8        5.9
70/09/17 1225              66     24.5         15        6.9        5.9              24.5        15        6.9        5.9
70/09/17 1325              66     24.0         15        6.9        6.5              24.0        15        6.9        6.5
70/09/17 1425              66     24.5         14        7.0        6.6              24.5        14        7.0        6.6
70/09/17 1525              66     24.0         15        7.0        6.4              24.0        15        7.0        6.4
70/09/17 1620              66     24.0         15        7.0        6.4              24.0        15        7.0        6.4
70/09/17 1725              66     24.0         15        7.0        6.5              24.0        15        7.0        6.5
70/09/17 1820              66     24.0         17        6.9        6.3              24.0        17        6.9        6.3
70/09/17 1920              66     24.0         19        7.0        6.1              24.0        19        7.0        6.1
00/00/00
STATION  NUMBER            13     13.0         13       13.0       13.0              13.0        13       13.0       13.0
         MAXIMUM           66     25.0         19        7.0        6.6              25.0        19        7.0        6.6
         MINIMUM           66     24.0         14        6.8        4.8              24.0        14        6.8        4.8
         MEAN              66     24.3         16        6.9        5.9              24.3        16        6.9        6.0
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                           121960         CH-10
       SOUTHEAST REGION
       CHATTAHOOCHEE. RIVER                                      CHATT R GA HWY 219 N W LAGRANGE
                                                                 13 GEORGIA
                                                                 SOUTHEAST
                                                                 CHATTAHOOCHEE
                                                                 1113S050           2111204

                           00002      00010     00410     00403     00300                00010     00410     00403     00300
  DATE   TIME DEPTH HSAMPLOC    WATER     T ALK      LAB       DO                     WATER     T ALK      LAB       DO
  FROM    OF         % FROM     TEMP      CACO3      PH                               TEMP      CACO3      PH
   TO    DAY  FEET  RT BANK     CENT      MG/L       SU       MG/L                    CENT      MG/L       SU       MG/L
                                 LOG       LOG       LOG       LOG
70/09/17 0700              33     23.5        15       6.8       5.8                   23.5        15       6.8       5.8
70/09/17 0800              33     23.5        14       6.8       5.8                   23.5        14       6.8       5.8
70/09/17 0900              33     23.5        15       6.8       6.3                   23.5        15       6.8       6.3
70/09/17 1000              33     23.5        15       6.8       6.3                   23.5        15       6.8       6.3
70/09/17 1100              33     23.5        15       6.8       6.1                   23.5        15       6.8       6.1
70/09/17 1200              33     23.5        14       6.8       6.3                   23.5        14       6.8       6.3
70/09/17 1300              33     24.0        14       6.8       6.3                   24.0        14       6.8       6.3
70/09/17 1400              33     24.0        15       6.9       6.1                   24.0        15       6.9       6.1
70/09/17 1500              33     23.5        15       6.9       6.3                   23.5        15       6.9       6.3
70/09/17 1600              33     23.5        16       6.8       6.4                   23.5        16       6.8       6.4
70/09/17 1700              33     23.5        16       6.9       6.0                   23.5        16       6.9       6.0
70/09/17 1800              33     23.5        20       6.8       6.3                   23.5        20       6.8       6.3
70/09/17 1900              33     23.5        14       6.8       6.4                   23.5        14       6.8       6.4
00/00/00
STATION  NUMBER            13     13.0        13      13.0      13.0                   13.0        13      13.0      13.0
         MAXIMUM           33     24.0        20       6.9       6.4                   24.0        20       6.9       6.4
         MINIMUM           33     23.5        14       6.8       5.8                   23.5        14       6.8       5.8
         MEAN              33     23.6        15       6.8       6.2                   23.6        15       6.8       6.2
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                                                          121960          CH-10
       SOUTHEAST REGION
       CHATTAHOOCHEE, RIVER                                                                      CHATT R GA HWY 219 N W LAGRANGE
                                                                                                 13 GEORGIA
                                                                                                 SOUTHEAST
                                                                                                 CHATTAHOOCHEE
                                                                                                 11135050          2111204

                                  00002       00010      00410      00403      00300                   00010      00410      00403      00300
  DATE     TIME DEPTH  HSAMPLOC       WATER      T ALK      LAB        DO                      WATER      T ALK      LAB        DO
  FROM      OF          % FROM        TEMP       CACO3      PH                                 TEMP       CACO3      PH
   TO      DAY  FEET   RT BANK        CENT       MG/L       SU         MG/L                    CENT       MG/L       SU         MG/L
                                      LOG        LOG        LOG        LOG
70/09/17 0705                66       23.5         14        6.8        6.1                    23.5         14        6.8        6.1
70/09/17 0805                66       23.5         14        6.8        6.1                    23.5         14        6.8        6.1
70/09/17 0905                66       23.5         14        6.7        6.3                    23.5         14        6.7        6.3
70/09/17 1005                66       23.5         14        6.7        6.1                    23.5         14        6.7        6.1
70/09/17 1105                66       23.5         14        6.7        6.3                    23.5         14        6.7        6.3
70/09/17 1205                66       23.5         13        6.8        6.3                    23.5         13        6.8        6.3
70/09/17 1305                66       24.0         14        6.9        6.3                    24.0         14        6.9        6.3
70/09/17 1405                66       24.0         15        7.0        6.3                    24.0         15        7.0        6.3
70/09/17 1505                66       23.5         16        6.9        6.3                    23.5         16        6.9        6.3
70/09/17 1605                66       23.5         14        6.7        6.4                    23.5         14        6.7        6.4
70/09/17 1705                66       23.5         16        6.9        6.1                    23.5         16        6.9        6.1
70/09/17 1805                66       23.5         16        6.7        6.0                    23.5         16        6.7        6.0
70/09/17 1905                66       23.5                              5.9                    23.5                              5.9
00/00/00
STATION  NUMBER              13       13.0         12       12.0       13.0                    13.0         12       12.0       13.0
         MAXIMUM             66       24.0         16        7.0        6.4                    24.0         16        7.0        6.4
         MINIMUM             66       23.5         13        6.7        5.9                    23.5         13        6.7        5.9
         MEAN                66       23.6         14        6.8        6.2                    23.6         15        6.8        6.2
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                                         121992          CH-12
       SOUTHEAST REGION
       CHATTAHOOCHEE. RIVER                                                     CHATT R AT US 27 FRNKLN
                                                                                13 GEORGIA
                                                                                SOUTHEAST
                                                                                CHATTAHOOCHEE        C-1    GDPH 15
                                                                                1113S050             6111204

                             00002     00010     00410     00403     00300                00010     00410     00403     00300
 DATE .  TIME DEPTH HSAMPLOC   WATER     T ALK      LAB        DO                   WATER     T ALK      LAB        DO
 FROM     OF        % FROM     TEMP      CACO3      PH                              TEMP      CACO3      PH
  TO     DAY   FEET RT BANK    CENT      MG/L       SU       MG/L                   CENT      MG/L       SU       MG/L
                               LOG       LOG        LOG      LOG
70/09/17 0700             33    21.0        15       6.7       6.5                   21.0        15       6.7       6.5
70/09/17 0800             33    21.0        15       6.8       5.8                   21.0        15       6.8       5.8
70/09/17 0900             33    21.0        14       6.9       5.7                   21.0        14       6.9       5.7
70/09/17 1000             33    21.5        15       6.9       5.7                   21.5        15       6.9       5.7
70/09/17 1100             33    21.5        15       6.9       5.8                   21.5        15       6.9       5.8
70/09/17 1200             33    21.5        17       6.9       5.7                   21.5        17       6.9       5.7
70/09/17 1300             33    22.0        15       6.8       5.7                   22.0        15       6.8       5.7
70/09/17 1400             33    22.0        16       6.9       5.7                   22.0        16       6.9       5.7
70/09/17 1500             33    22.5        18       7.0       5.6                   22.5        18       7.0       5.6
70/09/17 1600             33    22.5        16       6.9       5.6                   22.5        16       6.9       5.6
70/09/17 1700             33    23.0        18       6.9       5.5                   23.0        18       6.9       5.5
70/09/17 1800             33    22.5        15       7.0       5.3                   22.5        15       7.0       5.3
70/09/17 1900             33    22.5                                                 22.5
00/00/00
STATION  NUMBER           13    13.0        12      12.0      12.0                   13.0        12      12.0      12.0
         MAXIMUM          33    23.0        18       7.0       6.5                   23.0        18       7.0       6.5
         MINIMUM          33    21.0        14       6.7       5.3                   21.0        14       6.7       5.3
         MEAN             33    21.9        16       6.9       5.7                   21.9        16       6.9       5.7
99/99/99
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STORET RETRIEVAL DATE 71/04/22
       WEST POINT STUDY                                                    121992        CH-12
       SOUTHEAST REGION
       CHATTAHOOCHEE, RIVER                                                CHATT R AT US 27 FRNKLN
                                                                           13 GEORGIA
                                                                           SOUTHEAST
                                                                           CHATTAHOOCHEE       C-1    GDPH 15
                                                                           11135050            6111204

                          00002      00010     00410     00403     00300             00010     00410     00403     00300
  DATE    TIME DEPTH HSAMPLOC        WATER     T ALK      LAR       DO               WATER     T ALK      LAR       DO
  FROM     OF         % FROM         TEMP      CACO3      PH                          TEMP     CACO3      PH
   TO     DAY   FEET  RT BANK        CENT      MG/L       SU       MG/L               CENT     MG/L       SU       MG/L
                                      LOG       LOG       LOG       LOG
70/09/17 0705                 66     21.0        14       6.7       5.9              21.0        14       6.7       5.9
70/09/17 0805                 66     21.0        16       6.9       5.7              21.0        16       6.9       5.7
70/09/17 0905                 66     21.0        16       6.9       5.7              21.0        16       6.9       5.7
70/09/17 1005                 66     21.5        14       6.9       5.6              21.5        14       6.9       5.6
70/09/17 1105                 66     21.5        14       6.7       5.6              21.5        14       6.7       5.6
70/09/17 1205                 66     21.5        14       6.9       5.7              21.5        14       6.9       5.7
70/09/17 1305                 66     22.0        14       6.7       5.9              22.0        14       6.7       5.9
70/09/17 1405                 66     22.0        17       7.0       5.6              22.0        17       7.0       5.6
70/09/17 1505                 66     22.5        17       7.0       5.5              22.5        17       7.0       5.5
70/09/17 1605                 66     22.5        17       7.0       5.7              22.5        17       7.0       5.7
70/09/17 1705                 66     23.0        16       6.8       5.7              23.0        16       6.8       5.7
70/09/17 1805                 66     22.5        17       6.9       5.5              22.5        17       6.9       5.5
70/09/17 1905                 66     22.5                                            22.5
00/00/00
STATION  NUMBER               13     13.0        12      12.0      12.0              13.0        12      12.0      12.0
         MAXIMUM              66     23.0        17       7.0       5.9              23.0        17       7.0       5.9
         MINIMUM              66     21.0        14       6.7       5.5              21.0        14       6.7       5.5
         MEAN                 66     21.9        15       6.9       5.7              21.9        16       6.9       5.7
99/99/99
```

APPENDIX H

Phytoplankton Data for
West Point Preimpoundment Surveys
September 1970 and February 1971

WEST POINT PHYTOPLANKTON
(September 14, 1970)

	Algae (number per milliliter)									Inert Diatoms Shells	
		Blue Green		Green		Flagellates (pigmented)		Diatoms			
Sta. No.	Total Algae	Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate	Centric	Pennate
1	264	0	1	0	0	0	0	33	198	66	66
2	297	132	0	0	0	0	0	66	99	0	0
3	264	0	0	0	0	0	0	99	165	66	132
4	495	0	0	0	0	0	0	99	396	33	132
5	495	0	33	132	33	66	0	66	165	0	33
6	462	0	33	33	0	0	0	132	264	33	99
7	462	0	0	165	0	0	0	99	198	33	132
8	363	0	0	66	0	0	0	66	231	33	132
9	132	0	0	0	0	0	0	66	66	0	33
10	231	0	33	0	33	0	0	0	165	0	33
11	66	0	0	0	0	0	0	66	0	0	66
12	264	0	0	33	0	0	0	165	66	33	66
13	33	0	0	0	0	0	0	33	0	66	66

WEST POINT PHYTOPLANKTON
(September 18, 1970)

Sta. No.	Total Algae	Blue Green		Green		Flagellates (pigmented)		Diatoms		Inert Diatoms Shells	
		Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate	Centric	Pennate
1	297	66	0	0	0	0	0	66	165	66	0
2	264	0	0	33	0	0	0	99	132	0	165
3	132	0	0	0	0	0	0	99	33	33	66
4	396	0	0	33	0	0	0	66	297	33	99
5	429	0	0	99	0	0	0	66	264	33	99
6	429	0	0	99	0	0	0	99	231	33	132
7	231	0	0	66	0	0	0	33	132	0	165
8	231	0	0	0	0	0	0	33	198	0	132
9	NO SAMPLE										
10	396	0	0	165	0	0	0	99	132	33	66
11	33	0	0	0	0	0	0	33	0	0	99
12	66	0	33	0	0	0	0	33	33	33	198
13	99	0	0	0	0	0	0	33	66	33	66

WEST POINT PLANKTON
(February 14, 1970)

	Algae (number per milliliter)											
		Blue Green		Green		Flageliates (pigmented)		Diatoms		Inert Diatom Shells	
Sta. No.	Total Algae	Coccoid	Filamentous	Coccoid	Filamentous	Green	Other	Centric	Pennate	Centric	Pennate
1	222	0	0	101	0	20	0	0	101	0	20
2	361	0	0	60	40	40	0	20	201	0	60
3	261	0	0	80	20	40	0	20	101	0	20
4	160	20	0	40	20	20	0	20	40	0	0
5	140	0	0	60	20	40	0	0	20	0	40
6	140	0	0	60	20	0	0	0	60	0	20
7	281	0	0	80	20	40	0	0	141	0	0
8	120	0	0	0	40	40	0	0	40	0	20
9	80	0	0	20	20	20	0	0	20	0	20
10	583	0	0	161	20	80	0	20	302	0	40
11	140	0	0	80	20	20	0	0	20	0	40
12	483	0	0	181	20	60	0	101	121	20	40
13	140	0	0	80	0	20	0	20	20	0	20

APPENDIX I

Seasonal Distribution of Invertebrates Collected from Artificial Substrates in the Chattahoochee River and Major Tributaries Within the West Point Lake (Preimpoundment Study)

APPENDIX I

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations																			
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
TURBELLARIA																					
Planariidae	*S	1	1																	1	
	*W									1									1		
ANNELIDA																					
Oligochaeta	S	1		4					3	4	1	4	3			2	2		4	20	
	W		3	12	5	2	1		6	61		7	2			8	2		5		
Hirudinea	S																				
	W		1	1					1	15						1			5		
Dina parva	S			2	4				3	3		4	25			14	9		122	67	
	W																				
OSTRACODA	S	1																			
	W																				
ISOPODA																					
Lieerus sp.	S																				
	W														2			2			
Asellus sp.	S																				
	W														1						
AMPHIPODA	S			1																	
	W																				
Hyalella azteca	S																		2		
	W									2											
Synurella sp.	S						1														
	W																				
DECAPODA	S				1				1	1	2			1				1			2
	W							1		2								1			
HYDRACARINA	S						1		3	4	4	4				1	5			22	
	W								1								1		1		1
COLLEMBOLA																					
Isotoma sp	S																				
	W											1									
PLECOPTERA																					
Pteronarcys sp.	S																				
	W											1		1				1			

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* S = August 1970; W= February 1971

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations																			
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
Peltoperla sp.	*S																				
	*W																	1			
Taeniopteryx sp.	S																				
	W							1						1							
Nemoura spp.	S																				
	W				1	1		14				4		7				39			30
Neoperla sp	S																				
	W													1							
Neophasganophora sp.	S																				
	W							1										3			3
Acroneuria sp.	S							7													5
	W							2							1			5			3
Paragnetina sp.	S																				
	W																				1
Isogenus sp.	S																				
	W							1										2			1
Alloperla sp.	S																				
	W											1			15		1				
EPHEMEROPTERA																					
Tricorythodes albilineatus	S	179	15	74	4	77	40		38	49	42	49	69		1	26	30	9			8
	W																				
Caenia hilaris	S										2										
	W																				
Ephemerella spp.	S																				
	W							9	3	1		8		5	6		1	20	1		14
Centroptilum sp.	S																				
	W							1				1		4				2			1
Isonychia spp.	S							510									4			1	179
	W							14						1				1			35
Stenonema spp.	S	4	26	10		18	13	54	34	11	61	9	20	6	6	8	6	6		2	20
	W		4	25	19	18	10	20	26	30		35	5	65	1	9	6	10	1		42

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* S = August 1970; W = February 1971

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations																			
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
Stenonema carolina	*S			2																	
	*W																				
Stenonema exiguum	S	3						6													4
	W																				
Stenonema interpunctatum	S		4	4							5		10								
	W																				
Stenonema proximum	S													4				5			
	W																				
Stenonema rubrum	S							2													
	W																				
ODONATA																					
Gomphus sp.	S										1										
	W																				
Boyeria vinosa	S																				
	W													1							
Hetaerina sp.	S															1					
	W																				
Argia sp.	S			2	3		3				2	3	3	5							1
	W																				
Argia moesta putrida	S																				
	W			1								1		1		1					
Argia translate	S	2	1		2				1												
	W																				
HEMIPTERA																					
Veliidae	S															1					
	W																				
Rheumatobates sp.	S																	1			
	W																				

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* S = August 1970; W = February 1971

-173-

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations																			
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
MEGALOPTERA																					
Corydalus cornutus	*S							3													1
	*W																	1			
TRICHOPTERA																					
Hydropsyche sp.	S	1	5	2		1					23			2							
	W							2		1		13		2				1			
Cheumatopsyche sp.	S							146		1	22	1		11	1					1	63
	W							24				6		3				7	1		20
Chimarra sp.	S																				1
	W							1										1			3
Oecetis sp.	S							1			1										2
	W																				
Pycnopsyche sp.	S																				
	W											1									
COLEOPTERA																					
Dineutus sp.	S							1													1
	W																				
Helichus sp.	S																				1
	W																	1			
Stenelmis sp.	S				1											1	1				1
	W											3									
Macronychus glabratus	S						1	2					2								2
	W									1		1		1							
Ancyronyx variegatus	S							2					2		9			1			
	W								4	1		2		2				1			
Unidentified coleoptera	S										1										
	W																				

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* S = August 1970; W = February 1971

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations 1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
DIPTERA																					
Tipulidae																					
Hexatoma sp.	*S														1						
	*W																				
Simuliidae	S	1		4	1	2	2	8	67	29	23	4	64			44	228			8	
	W							6						2				1			7
Chironomidae																					
Conshapelopia sp.	S										2										
	W			1						1											
Ablabesmyia sp.	S																				
	W			1	1																
Ablabesmyia auriensis	S											1				2					
	W									1											
Ablabesmyia jante	S	1					1				3	18	1						7	3	
	W																				
Ablabesmyia mallochi	S			1						1		6					1		1	1	
	W																				
Ablabesmyia ornata	S									1											
	W			1																	
Procladius sp.	S											9								1	
	W																				
Procladius culiciformis	S																				
	W			1																	
Diamesa longimanus	S																				
	W											1									
Brillia slavirons	S																				
	W			1	2							3		1							

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* S =August 1970; W = February 1971

-176.

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations 1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
Diplocladius sp.	*S																				
	*W								1			1			1						1
Nanocladius alternantherae	S							2													
	W									1									4		1
Nanocladius sp. 2 (Roback '57)	S																				
	W							1	1			3		2				2			1
Orthocladius sp.	S																				
	W				1										1						
Orthocladius m. sp.2 (Roback '57)	S																				
	W											1									
Cricotopus sp.	S										3								1		
	W									1											
Cricotopus m.sp.2 (Roback '57)	S																				
	W			1	2	1			4	1		3				1	1		1		
Cricotopus bicinctus	S																			8	
	W		1	4	3	1		1	44	8		5	3			7	9		6		
Cricotopus slossonae	S																				
	W											1									
Cricotopus trifasciatus	S										1										
	W																				
Trichocladius sp.	S																				
	W							1													1
Trichocladius robacki	S							1												1	1
	W											4									3

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* S = August 1970; W = February 1971

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations																			
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
Psectrocladius sp.	*S																				
	*W							1													2
Metriocnemus sp.	S																				
	W											1						3			1
Metriocnemus lundbecki	S																				
	W																	1			
Corynoneura (thienemanniella) xena	S							1													
	W							1													
Parachironomus pectinatellae	S																		4	1	
	W																				
Dicrotendipes sp.	S																			1	
	W																				
Polypedilum sp.	S					1					1		1				1			3	
	W																				1
Polypedilum halrerale	S																				
	W														1						
Polypedilum sp. A (Roback '53)	S																				
	W							1	1			3						7			
Tanytarsus sp.	S																			1	
	W																	1			
Tanytarsus sp. B (Beck)	S																			1	
	W																				

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* S = August 1970; W = February 1971

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT SURVEY
(Per Limestone Sampler Exposed for Five Weeks)

Organisms		Stations																			
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L	6R	7	8	9	10L	10R	11	12L	12R	13
Rheotanytarsus exiguus	*S		1			1			1												1
	*W																	1			
GASTROPODA																					
Physa sp.	S						1		3	1		11	6			5	2		2	56	
	W									2									6		
Goniebasis sp.	S																				
	W									6											
PELECYPODA																					
Corbicula sp.	S	113	14	2	25	10	7		1												
	W		3	1	1					1											
TOTAL SPP.	S	11	8	12	8	7	10	15	11	11	19	13	12	6	5	11	12	6	8	20	17
	W	-	5	12	9	5	2	20	11	20	-	26	3	17	9	6	7	26	11	-	22
TOTAL INDIVIDUALS	S	307	67	108	41	110	70	746	155	105	200	123	206	29	18	105	290	23	143	200	293
	W	-	12	50	35	23	11	103	92	138	-	111	10	100	29	27	21	117	32	-	173
RELATIVE ABUNDANCE OF THE MAJOR TAXA:																					
Worms	S	2	1	6	4	0	0	0	6	7	1	8	28	0	0	16	11	0	126	88	0
	W	-	4	13	5	2	1	0	7	77	-	7	2	0	0	9	2	0	11	-	0
Crustaceans	S	1	0	1	1	0	2	0	4	5	6	4	0	1	0	1	5	1	2	22	2
	W	-	0	0	0	0	0	1	1	4	-	0	0	0	3	0	1	3	1	-	1
Insects	S	191	52	99	11	100	60	746	141	92	193	100	172	28	18	83	272	22	13	34	291
	W	-	5	36	29	21	10	102	84	48	-	104	8	100	26	18	18	114	14	-	172
Mollusks	S	113	14	2	25	10	8	0	4	1	0	11	6	0	0	5	2	0	2	56	0
	W	-	3	1	1	0	0	0	0	9	-	0	0	0	0	0	0	0	6	-	0

*S = August 1970; W = February 1971

APPENDIX I (cont'd)

SUMMER AND WINTER MACROINVERTEBRATE POPULATIONS FOR WEST POINT PREIMPOUNDMENT STUDY
(Per Limestone Sampler Exposed for Five Weeks)

		Stations									
		1L	1R	2L	2R	3L	3R	4	5L	5R	6L
RANGE	*S	1-179	1-26	1-74	1-25	1-77	1-40	1-510	1-67	1-49	1-61
	*W	-	1-4	1-25	1-19	1-18	1-10	1-24	1-44	1-61	1

		Stations									
		6R	7	8	9	10L	10R	11	12L	12R	13
RANGE	S	1-49	1-69	1-11	1-9	1-44	1-228	1-9	1-122	1-67	1-179
	W	1-35	2-5	1-65	1-15	1-9	1-9	1-39	1-6	-	1-42

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* S = August 1970; W = February 1971

APPENDIX J

Georgia Water Quality Standards

and

Chattahoochee River Classification

RULES
OF
STATE WATER QUALITY CONTROL BOARD

CHAPTER 730-3
WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS

TABLE OF CONTENTS

730-3-.01 Purpose

730-3-.02 Definitions

730-3-.03 Water Use Classifications

730-3-.04 General Criteria for All Waters

730-3-.05 Specific Criteria for Classified Water Usage

730-3-.06 Exceptions

730-3-.07 Treatment Requirements

730-3-.08 Streamflows

730-3-.09 Mixing Zone

730-3-.10 Notwithstanding the Foregoing

730-3-.11 Effective Date

730-3-.01 PURPOSE - The purpose of this rule is to establish water quality standards for prevention of pollution, enhancement of water quality and protection of public health or welfare, in accordance with the public interest in drinking water supplies, conservation of fish, game and other beneficial aquatic life, and agricultural, industrial, recreational and other beneficial uses.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.02 DEFINITIONS - All terms used in this rule shall be interpreted in accordance with definitions as set forth in the Act and as otherwise herein defined.

(1) "Reasonable and necessary uses" mean drinking water supplies, conservation of fish, game and other aquatic life, agricultural, industrial, recreational and other legitimate uses.

(2) "Shellfish" refers to clams, oysters, scallops, mussels and other mollusks.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.03 WATER USE CLASSIFICATIONS - Water use classifications for which the criteria of this rule are applicable are as follows:

(1) Drinking Water Supplies
(2) Recreation
(3) Fishing, Propagation of Fish, Shellfish, Game and Other Aquatic Life.
(4) Agricultural
(5) Industrial
(6) Navigation

Authority: Ga. Laws 1964, p.416, as amended.

730-3-.04 GENERAL CRITERIA FOR ALL WATERS - The following criteria are deemed to be necessary and applicable to all waters of the State:

(1) All waters shall be free from materials associated with municipal or domestic sewage, industrial waste or any other waste which will settle to form sludge deposits that become putrescent, unsightly or otherwise objectionable.

(2) All waters shall be free from oil, scum and floating debris associated with municipal or domestic sewage, industrial waste or other discharges in amounts sufficient to be unsightly or to interfere with legitimate water uses.

(3) All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses.

(4) All waters shall be free from toxic, corrosive, acidic and caustic substances discharged from municipalities, industries or other sources in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.

(5) The maximum permissible concentration of radio-nuclides in the waters of the State must conform to the limits which are cited in Chapter 270-5-20, "Control of Radioactive Materials", of the Rules and Regulations of the Georgia Department of Public Health.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.05 SPECIFIC CRITERIA FOR CLASSIFIED WATER USAGE - The following criteria are deemed necessary and shall be required for the specific water usage as shown:

(1) Drinking Water Supplies -

(a) Those waters approved by the Georgia Department of Public Health and requiring only approved disinfection and meeting the requirements of the latest edition of "Public Health Service Drinking Water Standards"; or waters approved by the Georgia Department of Public Health for human consumption and food-processing or for any other use requiring water of a lower quality.

1. Bacteria: Fecal coliform not to exceed a mean of 50 per 100 ml (MPN) based on at least four samples taken over a 30-day period and not to exceed 200 per 100 ml in more than five percent of the samples in any 90-day period.

2. Floating solids, settleable solids, sludge deposits or any taste, odor or color producing substances: None associated with any waste discharge.

3. Sewage, industrial or other wastes: None.

(b) Those raw water supplies requiring approved treatment to meet the requirements of the Georgia Department of Public Health and the latest edition of "Public Health Service Drinking Water Standards" or which are approved by the Georgia Department of Public Health for human consumption and food-processing; or for any other use requiring water of a lower quality.

1. Bacteria: Fecal coliform not to exceed a mean of 5,000 per 100 ml (MPN) based on at least four samples taken over a 30-day period and not to exceed 20,000 per 100 ml in more than five percent of the samples taken in any 90-day period.

2. Dissolved Oxygen: Not less than 4.0 mg/l at any time; a minimum of 5.0 mg/l at all times for waters designated as trout streams by the State Game and Fish Commission.

3. pH: Within the range of 6.0 - 8.5.

4. No material or substance in such concentration that, after treatment, would exceed the requirements of the Georgia Department of Public Health and the latest edition of "Public Health Service Drinking Water Standards".

5. Temperature: Not to exceed 93.2°F. (34.0°C.) at any time and not to be increased more than 10°F. above intake temperature. In streams designated as trout waters by the State Game and Fish Commission, there shall be no elevation or depression of natural stream temperatures.

(2) Recreation - General recreational activities such as water skiing, boating and swimming, or for any other use requiring water of a lower quality. These criteria are not to be interpreted as condoning water contact sports in proximity to sewage or industrial waste discharges regardless of treatment requirements imposed on such waters.

(a) Bacteria: Fecal coliform not to exceed a mean of 1,000 per 100 ml (MPN) based on at least four samples taken over a 30-day period, and not to exceed 4,000 per 100 ml in more than five percent of the samples taken in any 90-day period.

(b) Dissolved oxygen: Not less than 4.0 mg/l except that those streams designated as trout waters by the State Game and Fish Commission must have a minimum of 5.0 mg/l at all times.

(c) pH: Within the range of 6.0 - 8.5.

(d) Toxic Wastes, Other Deleterious Materials: None in concentrations that would harm man, fish and game or other beneficial aquatic life.

(e) Temperature: Not to exceed 93.2°F. (34.0°C.) at any time and not to be increased more than 10°F. above intake temperature. In streams designated as trout waters by the State Game and Fish Commission, there shall be no elevation or depression of natural stream temperatures.

(3) Fishing, Propagation of Fish, Shellfish, Game and Other Aquatic Life; or for any other use requiring water of a lower quality.

(a) Dissolved Oxygen: A minimum of 5.0 mg/l at all times for streams designated as trout waters by the State Game and Fish Commission; a minimum of 4.0 mg/l at all times for waters supporting warm water species of fish.

(b) pH: Within the range of 6.0 - 8.5.

(c) Bacteria: Fecal coliform not to exceed a mean of 5,000 per 100 ml (MPN) based on at least four samples taken over a 30-day period and not to exceed 20,000 per

100 ml in more than five percent of the samples in any 90-day period.

(d) Bacteria: (Applicable only to shellfish to be commercially harvested.) Total coliform group not to exceed a median MPN of 70 per 100 ml, and not more than 10 percent of the samples shall exceed an MPN of 230 per 100 ml for a 5-tube decimal dilution test (or 330 per 100 ml where a 3-tube decimal dilution is used) in those areas most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.*

(e) Temperature: Not to exceed 93.2°F. (34.0°C.) at any time and not to be increased more than 10°F. above intake temperature. In streams designated as trout waters by the State Game and Fish Commission, there shall be no elevation or depression of natural stream temperatures.

(f) Toxic Wastes, Other Deleterious Materials: None in concentrations that would harm man, fish and game or other beneficial aquatic life.

(4) Agricultural: For general agricultural uses such as stock watering and irrigating; or for any other use requiring water of a lower quality.

(a) Bacteria: Fecal coliform not to exceed a mean of 10,000 per 100 ml (MPN) based on at least four samples taken over a 30-day period and not to exceed 40,000 per 100 ml in more than five percent of the samples in any 90-day period.

(b) Dissolved Oxygen: A daily average of 3.0 mg/l and no less than 2.5 mg/l at any time.

(c) pH: Within the range of 6.0 - 8.5.

(d) Temperature: Not to exceed 93.2°F. (34.0°C.) at any time and not to be increased more than 10°F. above intake temperature.

(e) Toxic Substances, Other Deleterious Materials: None in concentrations or amounts that would interfere with or adversely affect uses for general agricultural purposes or would prevent fish survival.

*This is based on the requirements of the National Shellfish Sanitation Program Manual of Operations, Sanitation of Shellfish Growing Areas, published by the Public Health Service, U. S. Department of Health, Education and Welfare, and the requirements of the Georgia Department of Public Health.

(5) Industrial: For processing and cooling water with or without special treatment; or for any other use requiring water of a lower quality.

(a) Dissolved Oxygen: A daily average of 3.0 mg/l and not less than 2.5 mg/l at any time.

(b) pH: Within the range of 6.0 - 8.5.

(c) Toxic Substances, Other Deleterious Materials: None in amounts or concentrations that would prevent fish survival or interfere with legitimate and beneficial industrial uses.

(d) Temperature: Not to exceed 93.2°F. (34.0°C.) at any time and not to be increased more than 10°F. above intake temperature.

(6) Navigation: To provide for commercial ship traffic and protection of seamen or crews.

(a) Bacteria: Fecal coliform not to exceed a mean of 10,000 per 100 ml (MPN) based on at least four samples taken over a 30-day period and not to exceed 40,000 per 100 ml in more than five percent of the samples in any 90-day period.

(b) Dissolved Oxygen: A daily average of 3.0 mg/l and no less than 2.5 mg/l at any time.

(c) pH: Within the range of 6.0 - 8.5.

(d) Toxic Substances, Deleterious Materials: None in concentrations or amounts that would damage vessels, prevent fish survival or otherwise interfere with commercial navigation.

(e) Temperature: Not to exceed 93.2°F. (34.0°C.) at any time and not to be increased more than 10°F. above intake temperature.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.06 EXCEPTIONS - It is recognized that certain natural waters of the State may have a quality that will not be within the general or specific requirements contained herein; therefore, the Board is empowered to make exceptions to the requirements upon presentation of adequate justification.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.07 TREATMENT REQUIREMENTS - Notwithstanding the above criteria, the requirements of the Board relating to secondary or equivalent treatment for all waste shall prevail. The adoption of these criteria shall in no way preempt the treatment requirements.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.08 STREAMFLOWS - Specific criteria or standards set for the various parameters apply to all flows on regulated streams. On unregulated streams, they shall apply to all streamflows equal to or exceeding the 7-day, 10-year minimum flow.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.09 MIXING ZONE - Effluents released to streams or impounded waters shall be fully and homogeneously dispersed and mixed insofar as practical with the main flow or water body by appropriate methods at the discharge point. Use of a reasonable and limited mixing zone may be permitted on receipt of satisfactory evidence that such a zone is necessary and that it will not create an objectionable or damaging pollution condition.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.10 NOTWITHSTANDING THE FOREGOING - The Board may authorize deviations from such standards, as the public interest may require or permit, consistent with Sections 2, 3(f), and 5(10) of the Act.

Authority: Ga. Laws 1964, p. 416, as amended.

730-3-.11 EFFECTIVE DATE - This Chapter shall become effective on June 13, 1967.

Authority: Ga. Laws 1964, p. 416, as amended.

CHATTAHOOCHEE RIVER (HEADWATERS - WEST POINT DAM)

Stream	Description	Recreation	Drinking Water	Industrial	Fishing	Navigation
Chattahoochee River	Headwaters to Buford Dam	X				
Chattahoochee River	Buford Dam to Atlanta (Peachtree Creek)		X			
Chattahoochee River	Atlanta (Peachtree Creek) to Cedar Creek			X		
Chattahoochee River	Cedar Creek to Franklin, Ga. (U. S. Highway 27)				X	
Chattahoochee River	U. S. Highway 27 Bridge at Franklin, Ga. to West Point Dam	X				

CHATTAHOOCHEE RIVER (WEST POINT DAM - GA. HWY. 91 AT NEAL'S LANDING)

Stream	Description	Recreation	Drinking Water	Industrial	Fishing	Navigation
Chattahoochee River	West Point Dam to West Point Mfg. Co. Water Intake		X			
Chattahoochee River	West Point Mfg. Co. Water Intake to Osanippa Creek				X	
Chattahoochee River	Osanippa Creek to Columbus, Ga. (14th Street Bridge)	X	X			
Chattahoochee River	Columbus, Ga. (14th Street Bridge) to Cowikee Creek				X	
Chattahoochee River	Cowikee Creek to Great Southern Div. of Great Northern Paper Company	X				
Chattahoochee River	Great Southern Div. of Great Northern Paper Company to Ga. Hwy. 91 (Neal's Landing)				X	

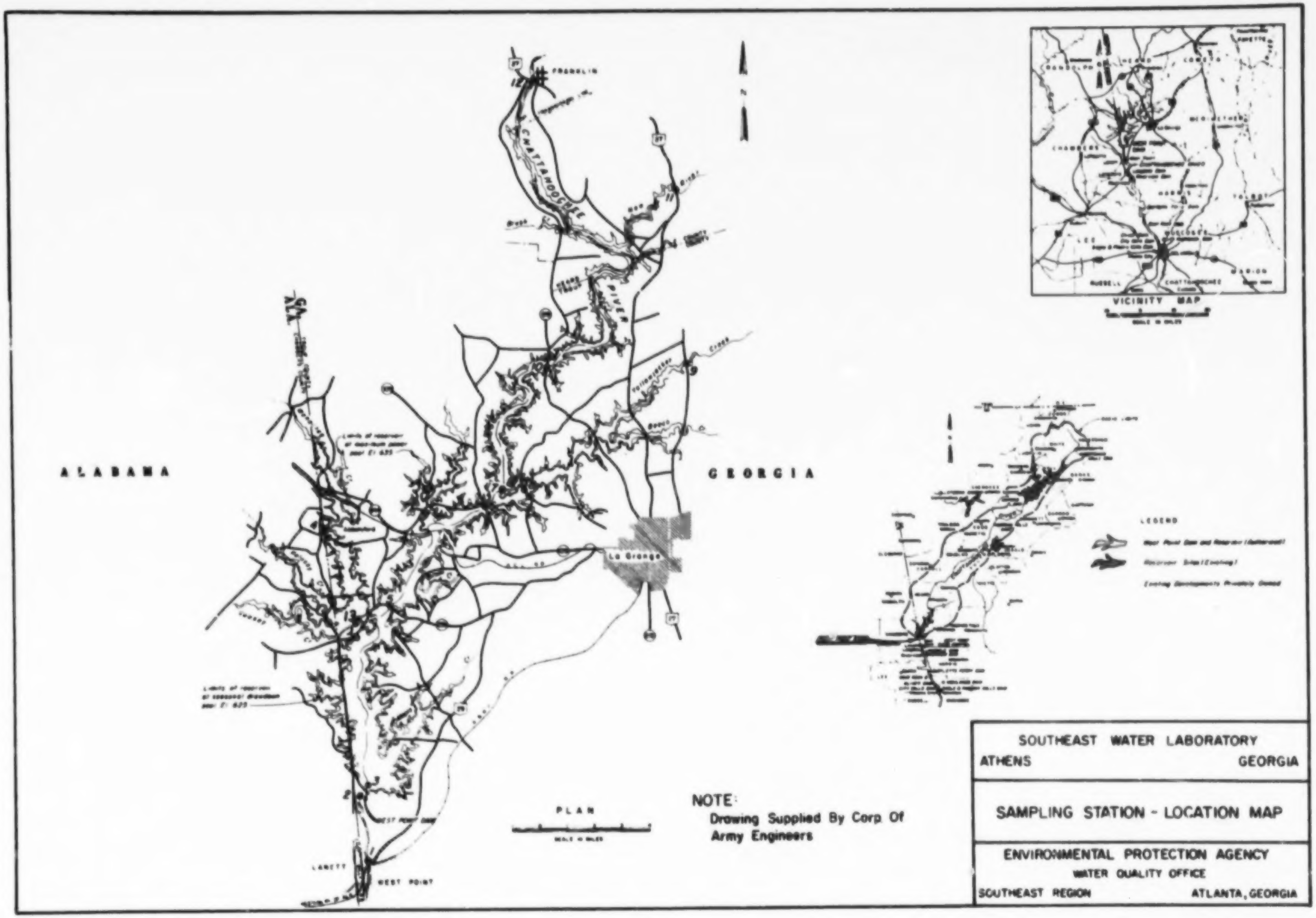
CHATTAHOOCHEE, OCHLOCKNEE, AUCILLA AND LOWER FLINT RIVERS

Stream	Description	Recreation	Drinking Water	Industrial	Fishing	Navigation
Chattahoochee River	Ga. Hwy. 91 (Neal's Landing) to Jim Woodruff Dam	X				
Ochlocknee River	Headwaters to Georgia-Florida State Line				X	
Aucilla River (Including Aucilla Creek)	Headwaters to Georgia-Florida State Line				X	
Lower Flint River	Albany-Georgia Power Company Dam at Lake Worth to Bainbridge - U. S. Hwy. 84 Bridge				X	
Lower Flint River	Bainbridge - U. S. Hwy. 84 Bridge to Jim Woodruff Dam, Lake Seminole	X				

PARTICIPATING STAFF

Herbert C. Barden	Microbiologist
Bobby J. Carroll	Microbiologist
Wm. Rodney Davis	Chemist
Ralph E. Gentry	Microbiologist
Ray N. Hemphill	Chemist
David W. Hill	Sanitary Engineer
Charles Holland	Technician
Wilburn F. Holsomback	Computer Operator
John A. Little	Sanitary Engineer
Joke S. Howard	Technician
Robert F. Schneider	Aquatic Biologist
Hugh C. Vick	Technician
M. Ronald Weldon	Aquatic Biologist
Tensey Whitmire	Stenographer
Roy A. Wiemert	Technician
Raymond T. Wilkerson	Technician

FIGURE 3


VICINITY MAP
FRANKLIN
CHATTAHOOCHEE
RIVER
GA.
ALA.
ALABAMA
GEORGIA
La Grange
LANETT
WEST POINT
LEGEND
PLAN

NOTE:
Drawing Supplied By Corp Of
Army Engineers

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

SAMPLING STATION - LOCATION MAP

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
SOUTHEAST REGION ATLANTA, GEORGIA

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